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AMERICAN MUSEUM
OF
NATURAL HISTORY

GENERAL GUIDE
TO THE
EXHIBITION HALLS

Guide Leaflet Series, No. 44
New York, August, 1916
Published by the Museum

American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

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THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world. The membership fees are:

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THE AMERICAN MUSEUM OF NATURAL HISTORY

South Façade, Facing Seventy-seventh Street

The corner stone of the Museum, which is intended to occupy all of Manhattan Square, was laid by General Grant in 1874. The material of the building is red granite, part from Nova Scotia and part from Texas. The portion completed is about one-third of the Museum as planned, and each façade is to be, like the present, 710 feet long, the most important architecturally to be that fronting Central Park. The total floor area of the present structure is more than ten acres, and the total cost $5,318,820.94.

GENERAL GUIDE

TO THE

EXHIBITION HALLS

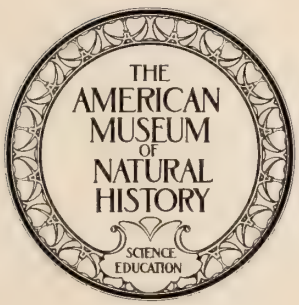
OF THE

AMERICAN MUSEUM OF NATURAL HISTORY

BY

FREDERIC A. LUCAS, Director

Assisted by Members of the Museum Staff



GUIDE LEAFLET SERIES No. 44

New York
Published by the Museum
August, 1916

The first General Guide to the Collections, comprising 54 pages and 16 illustrations, was issued in January, 1904.

The present edition comprises 136 pages and 75 illustrations.

A list of the popular publications of the Museum will be found at the end, beginning on page 134.

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The halls are named according to the position they will have in the completed Museum building, which will consist of four long façades facing east, west, north and south respectively, each connected with the center of the quadrangle formed by a wing extending between open courts. Thus the hall at the eastern end of the south façade (the only façade completed) becomes the "southeast pavilion."

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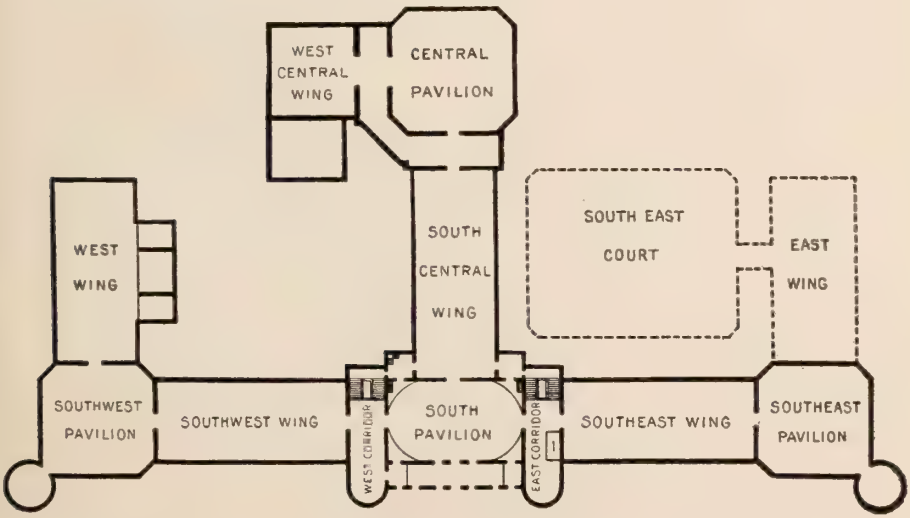
Prefatory Note.

It is the purpose of this Guide to call attention to the more important exhibits that the visitor will see as he passes through the halls; more detailed information regarding many of them may be obtained from the labels or from the *Guide Leaflets*.

It is frequently necessary to rearrange the exhibits in order to provide space for new material or to put into effect advanced ideas regarding methods of exhibition, and as these changes are taking place all the time, it unavoidably happens that now and then discrepancies will be found between the actual arrangement of the specimens and that noted in the GUIDE. Dr. Goode has said that a finished museum is a dead museum, and it is hoped that the visitor will look upon these necessary changes as indications of life and progress.



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GENERAL GUIDE TO THE MUSEUM

INTRODUCTION

The History and Work of the Museum

THE American Museum of Natural History was founded and incorporated in 1869 for the purpose of establishing a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects and to that end, of furnishing popular instruction.

History

For eight years its temporary home was in the Arsenal in Central Park. The corner stone of the present building in Manhattan Square was laid in 1874 by President U. S. Grant, and in 1877 the first section (South Central Pavilion) was completed.

Location

The Museum is located at 77th Street and Central Park West, and can be reached by the 8th or 9th Avenue surface cars, the 6th or 9th Avenue elevated to 81st Street station, or by the subway to 72nd or 79th Street station.

Hours of Admission

The Museum is open free every day in the year; on week days from 9 A. M. to 5 P. M., on Sundays from 1 to 5 P. M.

The Museum building is one of the largest municipal structures in the City, and has cost approximately $5,000,000. The South Façade is 710 feet in length; the total area of the floor space is 470,789 square feet, or about 10 acres, of which 271,886 square feet are open to the public. The building when completed is designed to occupy all of Manhattan Square.

Administration and Support

The building is erected and largely maintained by the City, through the Department of Parks. Building funds are provided for by issues of Corporate Stock, which have been made at intervals since 1871. The annual appropriation, known as the Maintenance Fund, is devoted to the heating, lighting, repair and supervision of the building and care of the collections.

The Museum is under the control of a self-perpetuating Board of Trustees, which has the entire direction of all its activities as well as the guardianship of all the collections and exhibits. The Trustees give their services without remuneration.

The funds which enable the Trustees to purchase specimens, to carry on explorations and various forms of scientific work, to prepare and publish scientific papers and to enlarge the library are raised by contributions from the Trustees and other friends. These contributions come from three sources—namely, (1) the Endowment Fund, (2) Membership Fund, (3) voluntary subscriptions.

The interest of the Endowment Fund, which includes the magnificent bequest of Mrs. Jesup, may be used for additions to the collections, research, and for publication. It can not be used for the care or repair of the building, construction of cases or other maintenance work, that is properly the province of the City to provide for.

The Membership Fund, derived from the subscriptions of Members, may be devoted to any purpose and is of particular importance in the educational work of the Museum.

Voluntary contributions may be used for general purposes or for such special object as the donor may designate; some of the most valuable and important collections have been obtained by such gifts.

Membership

There are at present about 3,700 Members. Annual Members contribute $10 a year for the support of the Museum; Life Members make a single contribution of $100. Membership fees are of great service in promoting the growth of the institution.

In the last edition of the Century Dictionary a museum is defined as:

Definition of a Museum

"A collection of natural objects, or of those made or used by man, placed where they may be seen, preserved and studied. Neither the objects themselves nor the place where they are shown constitutes a museum; this results from the combination of objects, place and purpose, display being an essential feature. The objects, or specimens, may be shown for general purposes only, or for the illustration of some subject or idea, the tendency of modern museums, being by the display of objects and the manner in which they are arranged and labeled to illustrate some fact in nature or in the history of mankind."

And E. Ray Lankester has very clearly stated that:

Purposes of Museums

"The purposes of a great national museum of natural history are: (1) To procure by its own explorers or by the voluntary assistance of independent naturalists the actual specimens upon which accurate knowledge of the animals, plants, and minerals of the earth's surface, and more especially of the national territory, is based; to preserve and arrange these collections for study by all expert naturalists, and to facilitate, directly or indirectly, the publication (in the form of catalogues or monographs) of the knowledge so obtained—with a view to its utilization, not only in the progress of science, but in the service of the State. (2) To exhibit in the best possible way for the edification of the public, at whose charges these collections are made and maintained, such specimens as are fitted for exposure in public galleries, with a view to the intelligent and willing participation of the people in the maintenance of the Museum."

BLIND CHILDREN STUDYING THE COLLECTIONS

At the North Pole with Peary.

How These Purposes Are Carried Out

The Museum not only maintains exhibits "for the edification of the public," but supplements the educational work performed by these and their accompanying labels by lectures and publications of a popular nature. A course of evening lectures is given every Spring and Fall for the Members, to which admission is to be had by ticket; also courses of Science Stories are given on Saturday mornings for the children of Members. Another series of lectures, free to the public, is given in conjunction with the Board of Education on Tuesday and Saturday evenings. Still another series, under the direction of the Museum's Department of Public Education, is given for the children in the Public Schools, and there are special lectures for the blind provided for by the Thorne Memorial Fund. The educational work of the Museum is carried still farther by means of its circulating collections for illustrating nature study which are sent free to the schools of Greater New York. The extent to which these collections are used is shown by the following statistics for the last five years:

Lectures

	1911	1912	1913	1914	1915
Number of Collections in use	512	537	597	675	671
Number of Schools of Greater New York Supplied	486	491	501	470	473
Number of Pupils Studying the Collections	1,253,435	1,275,890	1,378,599	1,273,853	1,238,581

The scientific side of the work of the Museum is based upon its explorations and study collections.

Study Collections

The Study Collections, as the name implies, are not only for the benefit of students but preserve a record of our vanishing animal life and of the life and customs of our own and other primitive peoples.

In the case of Natural History the vast majority of the specimens are in the study series, not only because they would ultimately be ruined by exposure to light but because the display of all material would only confuse the visitor. Moreover, no museum has room to show everything, and a careful selection is made of objects of the greatest educational value and these are so displayed as to enhance their interest and attractiveness.

The Study Collections are, briefly, as follows:

HOW SPECIMENS ARE CARED FOR

One of the fireproof storerooms of the Department of Anthropology.

Anthropology.—Ethnology.—On the attic floor of the west wing and the northwest pavilion there are thirty-three fireproof storerooms containing the ethnological study collections of more than 100,000 catalogue numbers, comprising extensive series for the Philippine Islands, Siberia, China, South Sea Islands, Africa, South Africa and the various culture areas in North America.

Archæology.—In archæology there is a large type series of stone objects from the various States of the Union. Full collections from excavated sites in British Columbia, Washington State, New York State, Kentucky, Arizona and New Mexico are here, together with a special series from the Trenton Valley. There is much material from Mexico, Peru and Bolivia

The human skeleton material is chiefly from western States and South America. About two thousand crania have been classified and made available for study.

Geology.—The study collections comprise, among other things, the Hitchcock series of rocks illustrating thirteen geological sections across the States of Vermont and New Hampshire; a complete set of duplicate specimens from the United States geological survey of the Fortieth Parallel; a series illustrating the early geological survey of Pennsylvania; a complete typical series of rocks and microscopic thin sections illustrating Rosenbusch's manual of petrography; large series of American rocks; a complete series typifying the rocks encountered in driving the Simplon tunnel, Switzerland; many ores and economic specimens.

Invertebrate Palæontology.—Great numbers of fossil invertebrates, too numerous and varied to particularize, but representing many of the important groups and including a large number of types.

Ichthyology and Herpetology.—Ichthyology.—The collection of fishes comprises about 7,000 catalogued specimens, preserved in alcohol and kept in tanks and jars.

The fossil fish collection is one of the largest, if not the largest, in America, comprising about 10,000 catalogued specimens; it includes the Newberry, the Cope and several smaller collections.

Herpetology.—The collection of frogs, salamanders and reptiles numbers 9,000 specimens.

Invertebrate Zoölogy.—General Invertebrates.—About 60,000 specimens of protozoans, sponges, polyps, starfishes, sea-urchins, worms, crustaceans, spiders, myriapods and chordates.

Insects.—(*a*) Local collection comprising insects within fifty miles of New York City. (*b*) General collection including more than 500,000 specimens, among them the types of many species.

Shells.—The chief Molluscan collections of the Museum, exclusive

of fossils. About 15,000 species are represented, comprised for the most part of the Jay and Haines collections.

Mammalogy and Ornithology.—Mammalogy.—The study collection of mammals contains about 35,000 skins, skulls and skeletons exclusive of the material obtained by the Congo Expedition which has not yet been catalogued. It is especially rich in South American forms. Mexico and the Arctic are well represented; from the latter region there is a large and unique series of the beautiful white Peary's caribou and of the Greenland muskox, comprising about 150 specimens. The collection of whales is likewise noteworthy.

Ornithology.—The study collection of birds consists of approximately 125,000 skins and mounted birds, about nine-tenths of which are from the Western Hemisphere, and several thousand nests and eggs. South America is chiefly represented by a large collection from Matto Grosso, Brazil, and extensive collections from Colombia; also smaller series from Ecuador, Peru, Venezuela and Trinidad.

From North America, there are important collections from Mexico, Nicaragua, California, Texas, Arizona and the Middle Atlantic States—the Rocky Mountain region being most poorly represented. Of special collections, the George N. Lawrence and Maximilian collections are of special importance from the hundreds of type specimens which they contain.

Mineralogy.—Most of the mineral specimen are on exhibition, but the overflow from the public cases forms a study series of no mean proportion.

Public Health.—Living bacteria are maintained and distributed free to recognized laboratories.

Vertebrate Palæontology.—The study collections comprise about 15,000 catalogued specimens of fossil mammals, 6,000 fossil reptiles and amphibians and a few hundred fossil birds. Most of these are from the western United States. The collections of fossil horses, Eocene mammals and Cretaceous dinosaurs are unrivaled. The fossil rhinoceroses, camels, oreodonts, carnivora, Fayûm, Pampean and Patagonian mammals, Jurassic dinosaurs, Permian reptiles, turtles, etc., are likewise of the first rank. They include more than nine hundred type specimens of fossil mammals and several hundred type specimens of fossil reptiles and amphibians.

Library

The Museum Library, located on the fifth floor, contains about 70,000 volumes on various branches of natural history (save botany), anthropology and travel. It is particularly strong in vertebrate palæontology and scientific periodicals. Like other museum libraries, it is of necessity a reference library, but, except on

Sundays and holidays, may be freely used by the public during the hours when the Museum is open.

Publications

The publications of the Museum, aside from the *Annual Report*, fall naturally into two groups: scientific and popular. The former, comprising the *Memoirs*, *Anthropological Papers* and *Bulletin*, contain information gathered by the various expeditions, or derived from the study of material collected; they are from the nature of their subjects mainly of a technical character. The *Memoirs* consist of the larger, more important papers, or those that call for unusually large illustrations. These are issued from time to time as occasion may demand. The *Bulletin* comprises the shorter papers, those that contain information that it is desirable to issue promptly, and a volume of about 400 pages is issued annually. The scientific papers are distributed, largely in exchange, to museums and libraries throughout the world.

The popular publications include the *Journal*, *Leaflets*, *Guides* and *Handbooks*, and are intended for the information of the general public. The *Journal*, begun in 1900, is the means of promptly informing the Museum Members of the work of the institution, giving the results of the many expeditions, telling of the collections made, or more important information gathered. It also describes at length interesting or noteworthy installations, and notes the accessions to the various departments, changes in the personnel of the Museum, and elections to Membership. The *Illustrated Guide Leaflets* deal with exhibits of particular interest or importance, such as the Habitat Group of Birds, the Evolution of the Horse, Meteorites, the Indians of Manhattan, calling attention to important objects on exhibition and giving information in regard to them. The *Handbooks*, four of which have been issued, deal with subjects or topics rather than objects. Thus the Plains Indians Handbook, by Dr. Wissler, is not merely a guide to the exhibition hall, but tells of the life and customs of these Indians, their language, political organization, religious beliefs and ceremonies.

The distribution of these popular publications is a part of the educational work of the Museum, as are the exhibits and lectures, and so far they have been necessarily sold below the cost of publication, as is done by other Museums. (*See list at end of this Guide.*)

Workshops

An important part of the Museum, not seen by the public, is the workshops, located in the basement and provided with machinery of the most improved pattern. Here, among other things, are constructed the various types of cases used in the Museum, including the light, metal-frame case, devised in the institution.

Still other rooms, which, of necessity, are not open to the public, are the laboratories, wherein is carried on the varied work of preparing

ENLARGED MODEL OF A RADIOLARIAN
One of many made in the Museum laboratories.

exhibits, work which calls for the services of a very considerable number of artists and artisans.

Here are cast, modeled, or mounted the figures for the many groups from Man to Myxine, here leaves are made to grow and flowers to bloom as accessories for beasts,* birds and fishes, to say nothing of reptiles and amphibians, and here, with painstaking care, are slowly created in glass and wax the magnified copies of invertebrates.

From all this may be gathered that a museum is a very busy place, much more so than the casual visitor is apt to imagine. In fact, a very good museum man has said that a museum is much like an iceberg, seven-eighths of it under water and invisible. We will now proceed to the visible eighth.

**See Guide Leaflet No. 34.*

Bench Mark

Before entering the Museum one notices the "Bench Mark" established by the U. S. Geological Survey in 1911 on which is inscribed the latitude and longitude, 40° 46′ 47.17″ N., 73° 58′ 41″ W., and height above sea level, 86 feet.

Glacial Pothole

On the right is a "pothole" from Russell, St. Lawrence Co., N. Y., formed by an eddy in the waters of a stream beneath the melting ice of the glacier that covered Northern New York. The stream carried pebbles that, whirled around by the eddy, cut and ground this hole, which is two feet across and four feet deep.

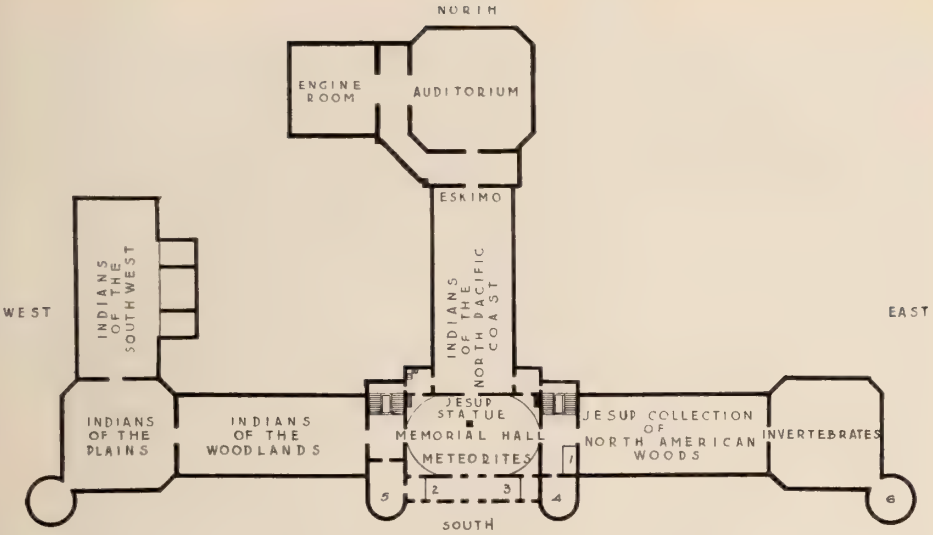
Glacial Grooves

On the left is a large slab of fossiliferous limestone from Kelleys Island in Lake Erie near Sandusky, whose surface has been smoothed, grooved and scratched by the stones and sand in the bottom of the vast moving ice sheet or glacier that covered the northeastern part of North America during the Glacial Epoch. The front of this continental glacier is now thought by most geologists to have retreated northward across Lake Erie from 30,000 to 50,000 years ago. At Kelleys Island the ice was moving from east to west.

AT THE ENTRANCE TO THE MUSEUM

MEMORIAL STATUE OF MORRIS K. JESUP

Mr. Jesup, President of the American Museum of Natural History for more than a quarter of a century, was a staunch supporter of the institution's two aims: to be a great educational institution for the people and also a center for activity in scientific research.



1. Elevators
2. Information Bureau
3. Visitors' Room
4. Academy Room
5. West Assembly Room
6. Collection of Corals

FIRST FLOOR

SOUTH PAVILION

Memorial Hall

Visitors' Room

The *Information Bureau* and the *Visitors' Room* are on either side of the south entrance. Wheel chairs for children or adults are available without charge. Postcards, photographs, guide leaflets, and Museum publications of various sorts are for sale, and visitors may arrange to meet friends here. On the right and left of the entrance are small *Assembly Halls* in which lectures to classes from the public schools of the City are given and where the New York Academy of Sciences and other scientific societies hold their meetings.

Statue of Morris K. Jesup

From the lobby the visitor first enters *Memorial Hall* and faces the marble statue of Morris K. Jesup, third President of the Museum. Mr. Jesup was a founder, trustee and benefactor of the Museum and for twenty-seven years its President. Under his administration and through his liberality the Museum made rapid progress. This statute of Mr. Jesup was executed by William Couper and was presented to the Museum by the Trustees and a few other friends. The marble busts in the wall niches represent noteworthy pioneers of American science, and are the gift of Morris K. Jesup.

THE VISITORS' ROOM

Where they may rest, meet their friends, write notes or purchase publications and postcards.

These include Benjamin Franklin, statesman and natural philosopher, Alexander von Humboldt, geographer and geologist, Louis Agassiz, zoölogist, Joseph Henry, physicist, John James Audubon, ornithologist, Spencer Fullerton Baird, zoölogist and founder of the United States Fish Commission, James Dwight Dana, geologist, John Torrey, botanist, Edward Drinker Cope, paleontologist, Joseph Leidy, anatomist, and Robert E. Peary, explorer.

Memorial Hall was once the lecture hall and here thousands have listened to Professor Bickmore.

Meteorites

Circling this same hall is a portion of the collection of meteorites, popularly known as "shooting stars," ranging in weight from a few pounds to 36 tons. The greater number of meteorites are stony, but the more interesting ones are composed chiefly of iron, while certain meteorites contain both stone and iron. The toughness of iron meteorites is due to the presence of nickel, and the fact that they were so difficult to cut led to the adoption of an alloy of nickel and iron in making the armor plate for battleships. Meteorites have a very definite structure and when polished (see specimens on the right with electric lamp) show characteristic lines which together with their composition are to the expert absolute proof that the specimens are meteorites.

Ahnighito Meteorite

Willamette Meteorite

"Ahnighito" or "The Tent" at the left is the largest known meteorite in the world, and was brought from Cape York, Greenland, by Admiral R. E. Peary. It weighs 36 tons, and its transportation to New York was an engineering feat. Opposite it at the right is the curiously pitted "Willamette" meteorite from Oregon which was the subject of a famous lawsuit. The smaller meteorites will be found in the Hall of Geology, fourth floor. [The collection of meteorites is described in *Guide Leaflet* No. 26.]

SOUTH CENTRAL WING

Indians of the North Pacific Coast

Indians of British Columbia and Alaska

North of Memorial Hall—that is to the rear of the Jesup statue—is the *North Pacific Hall*, where are displayed collections illustrating the culture of the Indians of the northwest coast of America. These collections are arranged geographically so that in passing from south to north through the hall the visitor meets with the tribes in the same sequence that he would in traveling up the west coast of North America.

WEAVING A CHILKAT BLANKET

One of the Mural Paintings of Will S. Taylor

Haida Canoe

The most striking object is the great Haida Canoe in the center of the hall. In it is being constructed a group representing a party of Chilkat Indians on the way to celebrate the rite of the "potlatch." The potlatch is the great "giving ceremony," common to all the coast tribes when individuals and families gladly impoverish themselves that the dead may be honored, and social standing of the clan or family recognized and increased. At the stern of the canoe, which is represented as approaching the beach, stands the chief or "medicineman," who directs the ceremony. The canoe is a hugh dugout made from a single tree, is 64½ feet long and 8 feet wide and capable of carrying 40 men.

Totem Poles

Against the pillars and walls of the hall are many house posts and totem poles with their grotesque carvings; the latter may represent either the coat of arms or family tree, or they may illustrate some story or legend connected with the family. The Haida Indians together with the Tlingit are recognized as superior in art to the other Indian tribes along the northwest coast of North America. They are divided into a number of families with various crests for each family and grouped into two main divisions, the Ravens and the Eagles. The Tlingit are makers of the famous Chilkat blankets, of which the Museum possesses an exceptionally fine collection. Among some of the other tribes there is little wool weaving, the clothing consisting of shredded and softened inner tree bark braided and matted together. The Indians of this region are preeminently a woodworking people, as is manifest in the exhibit.

Chilkat Blankets

Religious Ceremonies

Religious ceremonies and the wearing of masks generally supposed to aid the shaman or priest in curing disease were customary among most of the tribes. The masks represented guardian spirits and by wearing them the shaman impersonated these spirits and assumed their powers in healing the sick or obtaining game.

Totem pole at Wrangel, Alaska. At the bottom is a beaver with a frog under his chin; above is a raven; and above the raven a frog, which is surmounted by a human head.

Mural Decorations

The mural decorations by Will S. Taylor between the windows on both sides of the hall represent the industries and ceremonies of the Indians of this region. Those at the north end of the hall by Frank Wilbert Stokes relate to the Eskimo and their country.

The Eskimo collections are being arranged in the adjoining hallway and corridor. Here is a group showing the Eskimo woman cooking in the interior of a snow hut or igloo lined with sealskin. She is using a stone lamp filled with seal oil, which feeds the flame over which the

ESKIMO HOME SCENE

There are two instructive groups near the entrance to the Auditorium. In one, a home scene within a snow house or "igloo," an Eskimo woman is cooking blubber over the flame from a seal-oil lamp; the other represents an Eskimo woman fishing through the ice. The Museum is rich in Eskimo collections.

meal is being prepared. Nearby is an Eskimo woman fishing through the ice. She has formed a windbreak with blocks of ice. The fish-rod and hook, and the long ladle are made of bone, and with this latter she keeps the water in the hole from freezing over while she is fishing. In this section will be found collections obtained by the Stefansson-Anderson expedition from the Eskimo of Coronation Gulf, some of whom had never seen a white man. In other cases are shown the clothing of the Eskimo, the many ingeniously made implements, and many finely carved and engraved ivory objects.

Auditorium

The doorway at the north end of the hall leads to the *Auditorium*, which has a seating capacity of 1,400, and is equipped with two screens, 25 feet square, for stereopticons. Free public lectures are given here Tuesday and Saturday evenings from October to May under the auspices of the Board of Education. There are also special lectures for Members of the Museum as well as lectures for school children. At the entrance of the lecture hall is appropriately placed a bust of Professor Albert S. Bickmore, originator of the movement that resulted in the erection of the Museum, first curator, and founder of its lecture system.

Power Room

At the end of the corridor is the power room, where may be seen demonstrated the transformation of the potential energy of coal into heat, light and motion.

WEST CORRIDOR

To the right or west of the Jesup statue are three halls devoted to Indian collections. To reach these the visitor passes through the *West Corridor*, which is devoted to the temporary display of recent acquisitions or small collections of particular interest. Opening from this is the West Assembly Hall, frequently used for temporary exhibitions as well as meetings.

On the landing, at the head of the stairway, is the William Demuth collection of pipes and fire-making appliances from many parts of the world.

SOUTHWEST WING

Indians of the Woodlands

Indians of the Woodlands

The halls to the west contain collections from the North American Indians and together with the hall in the south central wing present the nine great culture areas of North America.

(See map on the right of the entrance.)

A MOHAWK CHIEF FROM THE MOHAWK VALLEY

From an engraving in the collection of the New York Historical Society.

The hall you now enter represents three of these culture areas. Filling the greater part of the hall are the tribes of the Eastern Woodlands who occupied the middle portion of the North American continent east of the Mississippi. In two wall cases on the left are exhibits of the Mackenzie region of the North and of the related tribes in Alaska west of that region. Midway of the hall on the right side are represented the peoples of the Southeast.

Decorated birchbark vessel of the Penobscot Indians.

Near the entrance of the hall will be found the remains of our local Indians. On the left are some specimens of pottery vessels and many small objects of stone and bone recovered from the Island of Manhattan and the neighboring territory of Staten Island, Long Island, and Westchester. Nearby on the same side of the hall are collections obtained from living Indians of the coast region north and south of New York. These are the Penobscot and Passamaquoddy of Maine, the Micmac and Malecite of the lower provinces of Canada, and a few but rare objects from the Delaware who once occupied the vicinity of New York City and the State of New Jersey.

On the opposite side, the north, are the Iroquois whose league comprised the Mohawk, Seneca, Oneida, Onondaga, Cayuga and later the Tuscarora. They dominated New York and much adjoining territory. The exhibits represent particularly the agriculture of the East, which was carried on with rude tools by the women.

In a case in the aisle are exhibited wampum belts which were highly esteemed in this region. They served as credentials for messengers and as records of treaties and other important events. Later wampum beads came to have a definite value as currency, especially in trade between the white men and the Indians.

In the farther end of the hall, on the left, are the collections from the Ojibway, Hiawatha's people, who lived mainly north of the Great Lakes. They had but little agriculture, living chiefly by hunting and fishing. Beyond the Ojibway are the Cree, who live still farther north. Here is to be seen the rabbit skin clothing of our childhood rhymes.

Opposite the Ojibway are the great Central Algonkian tribes, the Menomini and Sauk and Fox, who lived south and west of the Great Lakes. They gathered wild rice and hunted and fished, practicing also some agriculture. In one of the Menomini cases are some skin bags

beautifully worked in porcupine quills. These bags were used in the Midewin, the secret society of the shamans.

The dwellings are of several forms, among which may be mentioned the long rectangular houses of the Iroquois covered with oak-bark; the dome-shaped huts of Long Island and vicinity which were covered with mats and bundles of grass; and the familiar conical wigwam of the Ojibway covered with birchbark. The utensils are of pottery, wood or birchbark. Pottery was not made by all the Eastern tribes and seems to be associated with the practice of agriculture. The designs are incised, never painted. Bowls, trays, and spoons are made of wood and often decorated with animal carvings. The use of birchbark in the construction of light, portable, household vessels is a particular trait of our Eastern Indians.

A DANCER OF THE DOG SOCIETY
Arapaho Indian.

In the southeastern portion of the United States agriculture was highly developed. These tribes are represented by the Cherokee and Yuchi who made pottery, and by the Choctaw and Chitimacha who have interesting baskets made of cane. The Seminoles of Florida have maintained an independent existence in the Everglades for nearly a century. Their picturesque costumes are shown.

SOUTHWEST PAVILION

Indians of the Plains

The collections from the Indians of the Plains will be found in the hall adjoining. These Indians comprised the tribes living west of the

Mississippi and east of the Rocky Mountains as far south as the valley of the Rio Grande and as far north as the Saskatchewan. (See map on south wall.)

Indians of the Plains

Occupying the greater part of the hall beginning on the left are the buffalo hunting tribes: the Plains-Cree, Dakota, Crow, Blackfoot, Gros Ventre, Arapaho and Cheyenne. These tribes did not practise agriculture but depended almost entirely on the buffalo; buffalo flesh was their chief food, and of buffalo skin they made their garments. In some cases a buffalo paunch was used for cooking, and buffalo horns were made into various implements of industry and war. The spirit of the buffalo was considered a powerful ally and invoked to cure sickness, to ward off evil, and to give aid in the hunt. Whenever the buffalo herds led the way, the more

A DOG FEAST OF THE SIOUX

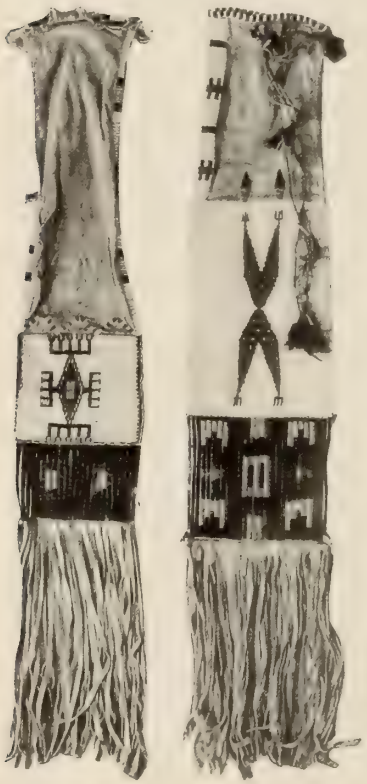
Given in honor of Mr. Sanford, Pierre Choteau and Catlin. From the Catlin Collection of paintings.

nomadic Plains tribes moved their tents and followed. With the extermination of the buffalo the entire life of the Plains Indians was revolutionized.

On the right, near the entrance, are the village tribes of the Plains; the Mandan with whom Lewis and Clark passed the winter of 1804-1805, the Hidatsa who now live with them, and the Omaha, Kansa, Iowa and Pawnee. All these tribes raised corn and lived in earth covered houses of considerable size. A small model of one of these houses stands near the exhibits.

In the center of this hall is a Blackfoot Indian tipi with paintings of otters on the sides, representing a vision of the owner. This tipi has been fitted up to show the home life of a typical buffalo hunting Indian.

Blackfoot Tipi



PIPE AND TOBACCO BAGS
Dakota Indians.

There were numerous soldier societies among the Plains Indians which included practically all the adult males. Each society had a special dance and special costumes. (See the Arapaho cases for costume dances.) There were other dances connected with tribal religious ceremonials, the best known and most important of which is the sun dance, illustrated by a model at the left of the tipi. The sun dance was held annually in the early summer in fulfillment of a vow made during the preceding winter by some member of the tribe who wished a sick relative to recover. The dance involved great physical endurance and excruciating selftorture, lasting three days, during which time the dancers neither ate nor drank.

Societies

Sun Dance

In the center of the hall is a genuine medicine pipe, held in awe by the Indians and dearly parted with; also the contents of a medicine pipe bundle. The contents of another medicine bundle, belonging to a leading man of the Blackfoot tribe (medicineman), together with the headdress which he wore in ceremonies, is in a case near the tower.

Medicine Pipe

The Plains Indians are noted for their picture writing on skins and for their quillwork, which has now been superseded by beadwork. They have a highly developed decorative art in which simple geometric designs are the elements of composition, this being one of the most interesting features of their art. (See Dakota case.) [See *Handbook* No. 1. North American Indians of the Plains.]

WEST WING

Indians of the Southwest

Pueblo Indians

On the left are collections from the sedentary Indians who occupy the pueblos of the Rio Grande and of Hopi, Acoma and Zuñi; and also the objects recovered from the prehistoric pueblos, caves, and cliff-dwellings. On the right are the nomadic Indians—the Eastern and Western Apache, the Navajo, the Pima and the Papago.

The sedentary Indians live in large community houses, often with several receding stories, built of stone or adobe. They depend chiefly upon agriculture for their food, make a great variety of pottery, and have many elaborate religious ceremonies. The nomadic peoples live in tipis or small brush and thatched houses which are moved or deserted when they are forced to seek the wild game and wild vegetable products which furnish much of their food. They make baskets for household purposes which are more easily transported than vessels of clay. There are models in the hall of the pueblos of Taos and Acoma, of prehistoric cliff-dwellings and of the houses used by the Navajo. In the first alcove on the left is shown the pottery of the villages along the Rio Grande, the principal art of the region, skin clothing, household utensils and ceremonial objects.

The upright cases of the next alcove are filled with wonderful prehistoric pottery. That in the wall case is from Pueblo Bonito. Similar gray and white ware with very elaborate and splendidly executed designs in an adjoining case are from Rio Tularosa, one of the upper tributaries of the Gila, where a vanished agricultural people once lived in pueblos and cliff-dwellings. A third case has material gathered by the Museum expedition now exploring Galisteo Valley, New Mexico. In the table case and in a case standing in the aisle are shown the wonderful art work in turquois, shell, stone and wood of the former inhabitants of Chaco Cañon. These objects, as well as the pottery from Pueblo Bonito mentioned above, were secured by the Hyde expedition.

In the next alcove, devoted to the Hopi, are the costumes, masks, images, and placques used in their ceremonies. Besides the well-known snake dance, the various Hopi villages have many interesting ceremonies, many of which are concerned with the rainfall and their crops.

The inhabitants of Zuñi are believed to be the descendants of the first people seen by the Spanish in 1540. Their former villages, many of which now are in ruins, were probably the "Seven Cities of Cibola," for which Coronado was searching at that time. Although they had

A PART OF THE HOPI GROUP

missionaries among them for about three centuries, they have retained many of their own religious ceremonies. Many objects pertaining to these ceremonies as well as to everyday life are shown in this alcove. In the last case on this side of the hall are examples of Zuñi and Acoma pottery.

At the north end of the hall opposite the Zuñi, space is given to an exhibit from the tribes of California. In the large end wall case the baskets of the region are arranged so as to show the various types.

Pima

The Pima, east side of the hall, practiced irrigation, raising by its aid the corn and beans on which they relied for food and the cotton which they used for their scanty garments. The Papago, with whom they are closely associated, occupied the more arid portions of southern Arizona and northern Sonora, securing their living from such desert products as the giant cactus, the century plant, the yucca and the mesquite and small game. Examples of their food, basketry, pottery, and ceremonial articles are shown.

From the aisle near the Pima-Papago section one catches a glimpse of the home of the Hopi. This large group represents the First Mesa with the village of Walpi. The canvas was painted by Howard McCormick and the figures were modeled by Mahonri Young.

Navajo

The Navajo, a large and widely scattered tribe, inhabit much of the country drained by the San Juan and Little Colorado rivers. During the winter they occupy houses like the one standing in the large annex, but in milder weather camp with the slight shelter of a cliff or a windbreak and shade made of brush. They live by raising corn in the moist valley and on the flesh of their numerous flocks of sheep.

They are the present-day blanket makers of North America. They make use of the wool of the sheep they raise, carding, spinning, and weaving it by means of the simplest implements and looms. This art is believed to have arisen since the coming of the Spanish and it is known to have passed through several stages in the last sixty years. The older types of blanket here shown contain yarn which was obtained by cutting or ravelling from imported flannels, called in Spanish "bayeta," from which the blankets of this sort receive their name. These are either bright red or old rose in color, resulting from cochineal dye. Several blankets are made of yarn bought ready dyed from the traders and are called Germantowns. The greater number, however, contain yarn of native spinning, dyed with native vegetable and mineral dyes.

The Navajo are also expert silversmiths. Their tools and samples of workmanship are displayed in a case in the center of the hall.

The Western Apache live along the upper portion of the Gila and

Apache

Salt rivers, where they practice agriculture, gather the wild products and hunt. These were the people who, under Geronimo, raided the settlements of southern Arizona and northern Mexico and evaded our troops for years. They live in grass-thatched houses or in the open under the shade of flat-topped, open-sided shelters. In an adjoining alcove is being prepared an industrial group with painted background showing the well-watered San Carlos valley occupied by the Apache for many generations.

An attractive Navajo blanket from the Museum's valuable collection. The Navajo Indians of the Southwest are a wealthy, pastoral people, and the best Indian blanket makers of North America.

The Eastern Apache lived in buffalo-skin tipis. They went far out on the plains in search of the buffalo herds, avoiding, if possible, the plains tribes, but fighting them with vigor when necessary. In dress and outward life they resemble the Plains Indians, but in their myths and ceremonies they are like their southwestern relatives and neighbors. The baskets of the Apache are shown in the large end case, which is in contrast with the corresponding case of pottery on the other side of the hall. Not the environment but social habits caused one people to develop pottery and the other to make the easily transported and not easily breakable baskets. [See *Handbook*, Indians of the Southwest.]

[*Return to the Jesup Statue.*]

EAST CORRIDOR

Polar Maps

Leaving the statue on the left and "Willamette" meteorite on the right, and going east, the visitor enters the corridor where the elevators are located (*East Corridor*). Here will be found maps of the north and south polar regions showing the routes of explorers. On the wall are sledges used by Admiral Peary in his last three expeditions in search of the North Pole. The Morris K. Jesup sledge, which the Admiral used in his successful polar expedition is the one nearest the entrance. The various sledges in their differences of style show the persistent effort made by Admiral Peary to bring the sledge up to its greatest possible usefulness. That he was successful on his last trip was in part due to the final modification.

Polar Expeditions

Peary Sledges

On the opposite side of the map is one of the sledges used by Amundsen on his journey to the South Pole. [A history of south polar expeditions is given in *Guide Leaflet* No. 31.]

Amundsen Sledge

In a room at the north end of this corridor is the large Mainka seismograph for recording the occurrence of earthquakes. This was given to the New York Academy of Sciences by Emerson McMillin, and by the Academy deposited in the Museum.

SOUTHEAST WING

Jesup Collection of North American Woods

To the east of the elevators is the *Hall of North American Forestry* containing the Jesup Collection of North American Woods, a nearly complete collection of the native trees north of Mexico, presented to the Museum by Morris K. Jesup. On the right is a bronze tablet, by J. E. Fraser, the gift of J. J. Clancy, depicting Mr. Jesup as he walked in his favorite wood at Lenox, Mass.

Jesup Collection of North American Woods

To the left is a section of one of the Big Trees of California, sixteen feet in diameter and 1341 years old. [See *Guide Leaflet* No. 42.] It began its growth in the year 550, so that it was nearly a thousand years

WILD PLUM IN THE FORESTRY HALL

Each of the five hundred species of trees in North America is represented by a section of trunk five feet long, some of a diameter not found in the country's forests to-day. Many of the specimens are accompanied by wax models of leaves, flowers and fruits accurately reproduced from life.

old before America was even discovered. The specimens show cross, longitudinal and oblique sections of the wood finished and unfinished, and the labels on the specimens give the distribution of the species, the characteristics of the wood and its economic uses. The trees are grouped by families and the location of each family will be found on the floor plan at the entrance of the hall. The reproductions of the flowers, leaves and fruits in natural size are instructive. This work is done in the Museum laboratories. Note the character of forests as shown by the transparencies.

SOUTHEAST PAVILION

Invertebrates

At the extreme east is the *Darwin Hall*, devoted chiefly to the invertebrate animals (those which do not possess a backbone) and to groups illustrating biological principles. Facing the entrance is a bronze bust of Darwin by Wm. Couper, presented by the New York Academy of Sciences on the occasion of the Darwin centenary in 1909. Passing around the hall from left to right the progression is from the lowest forms of animal life, the one-celled Protozoa, to the highest and most complex forms of animal life, the Primates, including man. The distinctive characteristics of each group are fully described on the alcove and case labels. Many of the minute forms are represented by skilfully prepared models in glass and wax showing the animal many times enlarged. Thus the visitor may obtain an idea of the form and structure of these animals which in spite of their small size have in so many instances such a vital influence on the life of man.

Synoptic Series

This alcove contains the lowest forms of animal life. All are single-celled individuals. The simplest kinds are abundant in swamps and stagnant water, others are found in myriads in the sea, while the ocean bottom in many localities is covered with them. The specimens exhibited in this alcove are mainly models, some of which are enlarged more than a thousand diameters.

Alcove I Protozoa

Sponges are principally of two kinds—those with skeletons or supporting structures of silica (i. e. flint) and those with skeletons of horny fiber. The sponges of commerce belong to the latter class. In the dry specimens exhibited the skeleton only can be seen, the living tissue having been removed. Many of the "glass" sponges are very

beautiful in design. Sponges range in size from the tiny *Grantia* of the New England coast to the gigantic "Neptune's goblets" found in the eastern seas. This alcove contains certain specimens whose tissue is represented in wax tinted to show the natural coloring of sponges, which varies from the bleached yellowish color commonly seen to deep brown or black, or yellow and red, in varying shades.

Alcove 2
Sponges

European commercial sponge comparable with the Florida yellow sponge or "Hardhead." The sponge industry in both the Mediterranean and the Bahama region is almost destroyed by careless methods, and conservation must be practiced here as in other of the world's resources.

In Alcove 3 are shown coral animals and their relatives: plantlike hydroids which often are mistaken for sea moss, but which really are a series of polyps living in a colony; jellyfishes with their umbrella-shaped bodies and long, streaming tentacles; brilliant colored sea anemones, sea fans and sea plumes; the magenta colored organ-pipe coral, the stony corals, and the precious coral of commerce. Coral polyps, mistakenly called "coral insects," are the animals that build up the coral reefs. In front of the window is a life-size model in glass of the beautiful Portuguese Man-of-War. This organism is really a colony of many polyp individuals attached to one another, and specialized for various functions.

Alcove 3
Polyps

The best known species in this group include the tape-worms, whose development and structure are shown by models in the central case and in the third section of the left-hand alcove case. These are parasitic flatworms. The less familiar free-living flatworms, which inhabit both salt and fresh water, are shown by enlarged models in the right-hand alcove case and illustrate well the great diversity of color and detail in this group.

Alcove 4
Flatworms

The Roundworms are also parasitic, since they live in the digestive canal of mammals. The most familiar is the common roundworm or stomach worm, *Ascaris*, of which an enlarged model is exhibited, showing the internal structure.

Alcove 5
Roundworms

[*Note for teachers and students.*—Some of the models

in each alcove are *anatomical*, i. e. so constructed as to show the internal organs of typical members of each group. In such cases, arbitrary colors chosen to designate the various systems of organs are adhered to consistently throughout the series. For example, the digestive system is shown in yellow, heart and blood-vessels in red, organs of excretion (kidneys) in green, reproductive system in gray, and the brain and other parts of the nervous system in black or neutral color.]

Alcove 6 Rotifers

The minute wheel animalcules comprise many exquisite and grotesque forms, some of which construct tubes of gelatinous substance, sand-grains, etc. A few of the species are parasites, but most of them live a free, active live. They are aquatic and found mainly in fresh water.

Alcove 7 Sea-Mats and Lamp-Shells

The sea-mats in Alcove 7 are plant-like animals which lead the colonial form of life. The majority of the species are marine, although a few occur in fresh water. The lamp-shells shown in this alcove superficially resemble clams, but by structure are more closely related to the worms and starfishes.

Alcove 8 Sea-Stars and Their Relatives

Alcove 8 is occupied by the sea stars, sea urchins, sea-cucumbers and sea lilies. The sea-star is the pest of the oyster beds, where it feeds on oysters and destroys them in large numbers. The brittle stars are so called because of their habit of dropping off one or more arms when handled or attacked. These, however, are later regenerated.

Alcove 9 Annulates

The annulates, typified by the familiar earthworm, are worms whose bodies are made up of rings or segments They are inhabitants of both fresh and salt water, many kinds living in the mud and sand of the shore while others bore into wood and shells. The marine annulates are often very beautiful in color and greatly diversified in form and habits, as illustrated by the models, many of which are greatly enlarged. The "houses" that these annulates build are often very beautiful and interesting. In the window is a group showing a section of mud flat on the New England coast, with the variety of worm-life found in what to the casual observer seems to be an uninhabited area, and illustrating some of their habits.

Alcove 10 Arthropods

Arthropods include the familiar crabs, lobsters, insects and their relatives. The number of existing species in this group is greater than that of all the rest of the animal and vegetable kingdoms together. No other group comprises so many species useful or harmful to man. In the case in the center of the alcove is a model showing the anatomy of the

common lobster, also enlarged models showing heads of various species of insects. On the wall are the two largest specimens of lobster that have ever been taken. They weighed when alive thirty-one and thirty-four pounds

Crustaceans and Insects

Marine Habitat Group. A community of starfishes, sea anemones, sea urchins and sponges as seen below the edge of a coral reef in the Bahamas

respectively. The largest of the arthropods is the giant crab of Japan, which, like that placed on the wall, may have a spread of about ten feet. The main exhibit of insects is displayed on the third floor.

The mollusks form a group second only to the arthropods in the vast number and diversity of forms which it embraces, including marine, fresh-water and land animals. All mollusks have soft bodies, but nearly all of them secrete a shell which in many species is of pearly material (mother-of pearl). Well-known examples of this group are the common clam and oyster and enlarged models in the center case show the anatomy of these species. A large collection of mollusks is shown on the third floor.

Alcove 11 Mollusks

Models of Clam and Oyster

Alcove 12 Chordates Including Vertebrates

Vertebrates include the largest, most powerful and most intelligent of animals. This group culminates in man, who still bears witness to his chordate ancestry in the retention of a chorda (cartilaginous spine), and gill clefts during embryonic life. Among these ancestral forms are the Ascidians, or Sea-squirts, an enlarged model of which is shown in the central case, while others are seen among the animals on the wharf-piles in the window group. Other models in the central case show the development of the egg of typical vertebrates.

Corals

In the circular tower alcove in the southeast corner of the hall is a comprehensive synoptic series of stony corals. Central cases in this tower and at its entrance show unusually large specimens, while a magnificent example of madrepore coral six feet in diameter is shown to the rear of the bust of Darwin. The associations of marine life found in the Bahamas are represented by several small groups in the center of the hall.

Models of the Malaria Mosquito

Here also four large models show the mosquito, which is the active agent in the spread of malaria. These models represent the insect enlarged seventy-five diameters or in volume four hundred thousand times the natural size. The mosquito in its development undergoes a metamorphosis. The model at the left shows the aquatic larval stage; the larvæ are the "wrigglers" of our rain-water barrels. The next model is the pupal stage, also aquatic. The third model is of the adult male mosquito, which is harmless, since it never bites man. The fourth model shows the adult female mosquito in the attitude of biting. It is so arranged as to show the internal organs, thus illustrating a typical insect anatomy. In another case is a series of models showing the life cycle of the malaria germ in the blood of man and in the mosquito.

Window Groups

In several of the alcove windows are habitat groups of invertebrates illustrating the natural history of the commoner and more typical animals.

Marine Worm Group

In the Annulate Alcove is shown the Marine Worm Group, reproducing these animals with their associates in their natural surroundings, as seen in the harbor of Woods Hole, Mass. The harbor and the distant view of Woods Hole village with the U. S. Fish Commission buildings are shown in the background, represented by a colored photographic transparency. In the foreground the shallow water of the harbor near the shore is represented in section to expose the animal life found on muddy bottoms among the eel-grass as well as the chimneys of various worm-burrows. In the lower part of the group a section of the sea bottom

A PART OF THE WHARF PILE GROUP

exposes the worms within the burrows. Several species of these are represented.

Shore Mollusk Group

In the Mollusk Alcove window is shown the natural history of a sand-spit at Cold Spring Harbor, Long Island, including some of the shore mollusks and their associates. The entrance of the harbor is seen in the distance. In the foreground at the edge of the sand-spit a mussel-bed is exposed by the receding tide over which fiddler-crabs are swarming into their burrows. Beneath the water surface an oyster is being attacked by a star-fish, while crabs and mollusks of various species are pursuing their usual activities.

Wharf Pile Group

The window group in the Vertebrate Alcove shows the piles of an old wharf at Vineyard Haven, Mass. Below the low-tide mark the submerged piles are covered with flower-like colonies of invertebrate animals. Among these are sea-anemones, tube-building worms, hydroids, mussels, seamats and several kinds of ascidians or sea-squirts. The latter are primitive members of the Chordate group which includes the vertebrates. Like the embryo of man, they possess during their larval period a chorda or cartilaginous spine. At first they are free swimming but later in life many of their organs degenerate and they become fitted to a stationary mode of life.

Variation Under Domestication

Other exhibits illustrate certain facts made clear by Darwin, and those who came after him. On the left facing the entrance variation under domestication is illustrated by dogs, pigeons, and domesticated fowls, the wild species from which they have been derived being shown in company with some of the more striking breeds derived from them.

Variation in Nature

On the right, various exhibits will show variation in nature. An example of this is the variation among the finches of the genus *Geospiza* in the Galapagos Islands.

Other examples show by means of a series of mollusks the range of color variation within a single species of West Indian Sun Shell, variation of sculpture within a single genus of land snail, and oscillation of variations about the normal type of the common scallop.

Struggle for Existence

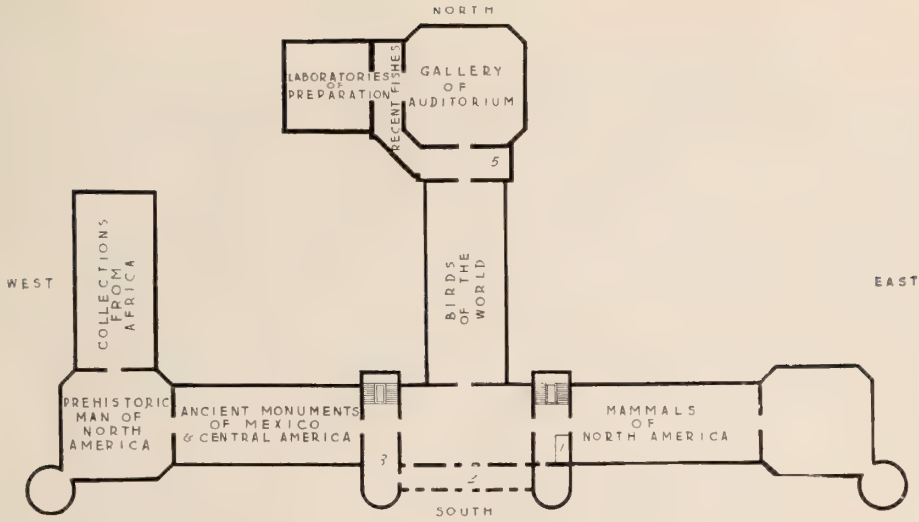
The struggle for existence is portrayed by the meadow mouse, surrounded by its many enemies and yet continuing to maintain an existence by virtue of its great birth rate.

Heredity

The simpler features of the laws of Heredity as elucidated by Mendel and his followers are illustrated by the inheritance of seed-coat color in the common pea, the color of sweet peas, and the coat-color of rats as shown in a series of panels in the neighboring case.

[*Return to the elevators.*]

KING PENGUINS FROM SOUTH GEORGIA



1. Elevators. 2. Copies of Maya Monuments. 3. Local Birds.

SECOND FLOOR

SOUTH PAVILION

This hall illustrates a phase of Museum progress, the temporary disorder that precedes an ultimate change for the better. At present the hall contains a mixed assemblage of animals brought hither from other halls in process of rearrangement; later it is hoped that it will contain a series of groups of birds from various parts of the world.

The group of king penguins from South Georgia Island is one of four devoted to the bird life of South America, but is at present provisionally installed, awaiting important changes in hall and cases.

Elephant "Tip"

The Asiatic elephant is the famous "Tip" brought to this country in 1881, and for seven years one of the attractions of Forepaugh's circus. He was given to the City of New York by Mr. Forepaugh and lived in the Central Park Menagerie until 1894 when, because of his treacherous disposition, it was found necessary to kill him. He is said to have caused the death of several of his keepers, and was twenty-three years old when killed.

Reptiles and Amphibians

Here, awaiting the construction of a new wing, is exhibited the collection of reptiles and amphibians. Because of the difficulty of preserving the natural covering of many of these animals they are usually exhibited in jars of alcohol. In the specimens on exhibition here the perishable parts have been cast in wax from

LOWER CALIFORNIA LIZARD GROUP

Showing the characteristic animal and plant life of one of the small desert islands off the coast of Lower California. The material for this group was collected by the "Albatross Expedition" of 1911, under Dr. C. H. Townsend.

life; for example, in the star tortoise the original "shells" of the specimens are used, while the head, neck and legs are restored in wax. The mounting not only brings out the principal features of the species exhibited, but in many instances illustrates also some distinctive habit of the animals; for instance, the common newt, one of the salamanders, is represented by a series of five life-size casts showing the process of shedding the skin; Pickering's hyla or the "spring peeper" is shown with vocal sacs inflated; the poisonous bushmaster is represented with its eggs, and so on.

The classification of these animals is shown in the upright cases; the groups in the center of the hall represent various reptiles as they appear in their natural haunts. They include the tuberculated iguana, the water moccasin, the diamond-backed rattlesnake, the Texas rattlesnake, the copperhead, the Gila monster, the pine snake, the box tortoise and the common painted turtle.

Cobra Group

One of the most interesting of the groups is a jungle scene in India showing a water monitor, which is the largest of living lizards, the poisonous Russell's viper and the deadly spectacled cobra, the last with hood distended and poised ready to strike. The cobra is said to be the cause of a large proportion of the 20,000 deaths which annually occur in India from snakebite. Examine carefully the group of the copperhead snake or "red-eye," one of the two species of poisonous snakes to be found in the vicinity of New York, and also the group contrasting the harmless watersnake with the poisonous water moccasin of southern cypress swamps. Two groups are devoted to rattlesnakes, which are easily recognized by the string of rattles at the end of the tail, by means of which they give warning before they strike. There are comparatively few species of poisonous snakes in the United States—about sixteen in all—comprising rattlesnakes, the moccasin, copperhead and two kinds of coral snake. All other species are harmless and in spite of the almost universal prejudice against them are very useful allies of man, since they live chiefly on rats, mice and insects injurious to crops.

Copperhead Snake Group

Bullfrog Group

Entering the darkened room nearby we find a group of unusual interest, showing the common bullfrog of North America. This group is a study of the bullfrog undisturbed in its typical haunt. It illustrates the changes from the tadpole to the adult frog and shows many of the activities of the frog—its molting, swimming, breathing under water and in air, croaking, and "lying low" before an enemy; also its food habits in relation to small mammals, to birds, snakes, insects, snails, to small fish and turtles.

Another group is the Great Salamander or Hellbender, best known in

the creeks of western Pennsylvania. The group pictures them at breeding time, and shows their characteristic stages and habits: thus one of the salamanders is pictured molting, another, a male, is brooding a great mass of eggs; and the group explains many details of their manner of living.

Great Salamander

This, the last and most beautiful of the series, depicts the spring life of a little pond in southern New England. In the water may be seen the egg masses and tadpoles of various toads and frogs, while in and about the pool are the young and full grown in characteristic poses, including some with air sacs distended in the act of "singing." Among these are the toad, the spring peeper, and the familiar tree toad. A bough of apple blossoms overhangs the water while all around the spring flowers are in bloom.

Toad Group

A BIT OF THE TOAD GROUP

Lower California Lizards

Instriking contrast to these water loving animals is a group of reptiles from one of the islands off the coast of Lower California that go without water entirely.

THE AMERICAN ROBIN—ONE OF THE GROUPS OF LOCAL BIRDS

WEST CORRIDOR

Local Birds

Adjoining the *South Pavilion* is the *West Corridor*, which contains the collections of local birds.

In this room are specimens of all the species of birds which have been known to occur within fifty miles of New York City. As far as possible each species is shown in all its different plumages. In the wall cases nearest the entrance on both sides is the *General Collection* of all birds likely to be seen within this area, arranged according to the current American system of classification. Near the windows are cases containing the *Seasonal Collection*, one section containing the permanent residents while others have their contents changed each month so that they may show always the birds present at the time. In another section are the stragglers from other parts of the country and from other countries which have been taken within our limits.

Besides the table case containing the eggs (often with the nest) of species known to nest within fifty miles of the City and the collection of

THE AZTEC GODDESS OF THE EARTH

The famous statue of the Aztec Goddess of the Earth called Coatlicue, "The Serpent-skirted One," is a striking example of barbaric imagination. It was found in Mexico City near the Cathedral in the year 1791. It doubtless occupied an important place in the great ceremonial center of Tenochtitlan, the Aztec capital, and probably dates from the last quarter of the 15th century.

The head, which is the same on front and back, is formed by two repulsive serpent heads meeting face to face. The feet are furnished with claws, but the arms, which are doubled up with the elbows close to the sides, end each in a serpent's head. The skirt is a writhing mass of braided rattlesnakes. The creature wears about the neck and hanging down over the breast a necklace of human hands and hearts with a death's head pendant in the center. Coatlicue seems to have been regarded as a very old woman and as the mother of the Aztec gods.

photographs showing many of them in nature, there are down the middle of the room a series of groups of local breeding birds with their nests. These, the forerunners of our "Habitat Groups," were the first of their kind made for the Museum. [See *Guide Leaflet* No. 22.]

SOUTHWEST WING

Ancient Monuments of Mexico and Central America

Maya Art

Continuing west past the collection of local birds we enter the southwest wing, devoted to the ancient civilizations of Mexico and Central America. As the hall is approached casts of large upright stones appear completely covered by sculpture. These stones, called stelae, are found chiefly near Copan in Honduras and represent the highest art of the Maya civilization.

At the left of the entrance on the south side of the hall is the extensive exhibit from Costa Rica of Mr. Minor Keith. This includes stone sculpture and a great variety of pottery interesting in form and design. To this collection also belongs the gold and jade from Costa Rica arranged in the cases in the center of the hall.

On the south wall is a copy of the painted sculptures of the Temple of the Jaguars at Chichen Itza. Here are shown warriors in procession who seem to be coming to worship a serpent god. Prayers are represented as coming from their lips. This sculpture while Maya, shows strong evidence of Mexican influence in certain of its details.

In the table cases on this side of the hall are facsimile reproductions of native books or codices, which were painted free hand on strips of deerskin, paper, or cloth. Several original documents are also exhibited. The Spaniards, in their zeal to destroy the native religion, burned hundreds of these books, which recorded ceremonial rites and historical event by means of pictures and hieroglyphs.

Nearby is a replica of the Calendar Stone, which is a graphic representation of the four creations and destructions of the world, as well as a symbol of the sun and a record of the divisions of the year.

In the aisle near the end of the hall stands a copy of the great sacrificial stone, or Stone of Tizoc, on which is a record of the principal conquests made before 1487.

The statue of Coatlicue, the mother of the two principal Aztec gods, is a curious figure, made up of serpents.

These three sculptures were originally in the Great Temple enclosure at Tenochtitlan, the native name of Mexico City before its conquest by Cortez, but they have been removed to the Mexican National Museum.

ANCIENT GOLD OBJECTS FROM COSTA RICA
In the Minor C. Keith Collection.

The Nahua culture of Mexico extended through many centuries, relics of which are found deposited in distinct layers, one above the other. In the valley of Mexico there are three so-called culture horizons, the last being that of the Aztecs. These three stages of culture are represented on the north side of the hall beginning at the western end. We first have the Archaic Period as represented in the culture of Tarasca and Jalisco. Here are many crude figurines of pottery. The eyes and other features are formed by adding fillets of clay which are afterwards rudely modeled.

Next in order is the culture of the Toltecs, who were skilled in making pottery, the decorations of which were frequently stamped on with terra cotta stamps. Examples of this work together with the stamps are shown in one of the cases.

Near the middle of the hall the final period, that of the Aztecs, is shown representing their work in clay and stone.

Near the east end of the same side of the hall in the same order will be found the Archaic Period of Central America, and the succeeding Maya civilization as represented at Chichen Itza and Copan.

The Maya were perhaps the most highly civilized people in the New World. They built many cities of stone and erected many fine pillar-like stelae to which attention was called on entering the hall. The sculptures on these monuments represent priest-like beings who carry serpents and other ceremonial objects in their hands. There are also on them long hieroglyphic inscriptions containing dates in the wonderful Maya calendar. Maya history contains two brilliant periods. That of the south, extending from 160 A. D. to 600 A. D., was chiefly remarkable for its sculptures. The principal cities were Copan, Quirigua, Tikal, Yaxchilan, and Palenque. The second period fell between 950 A. D. and 1250 A. D., and centered in northern Yucatan. The chief cities were Chichen Itza, Uxmal and Labna, and the finest works of art were architectural.

SOUTHWEST PAVILION

Prehistoric Man of North America

Continuing west we pass into the *Southwest Pavilion*, likewise given over to archæology, in this instance that of North America. Here are examples of ancient pottery, arrow-heads, stone axes and other implements of stone and bone, mostly from burial mounds. The most important of these are the rude implements and fragments of human bones from the Trenton gravels, as these are the most probable evidences of man's antiquity on this continent. Notice that the arrangement

of the hall is geographical and by states. In addition there is a special exhibit of Mississippi Valley pottery in the wall cases and the Douglass type specimen series in the cases to the left.

Prehistoric Man in Europe

In the adjoining tower room are the implements and carvings made by the early inhabitants of western Europe. These are arranged in an evolutionary series, beginning with the so-called eoliths in the first case on the left, and continuing through the various stages of the paleolithic period to the neoliths of more modern times. This series, showing the gradually improving skill and artistic taste of primitive man, represents at least two hundred and fifty thousand years of man's early history, during which time Europe passed through alternating warm and frigid conditions as the great glacial ice cap crept down from the north and receded. This changing climate was accompanied by corresponding changes in the animals associated with man and on which he largely lived. Some of these are represented by the paintings on the walls copied from the caves of northern Spain and southern France where, soon after the final retreat of the great glacier, man left us illustrations in color of the bison, mammoth, reindeer and horse of that day.

PREHISTORIC STONE IMPLEMENTS

WEST WING

Collections From Africa

Opening to the north from this hall of North American Archæology is the *African Hall.* This differs from other halls in containing besides ethnographical specimens a number of characteristic African mammals. The future extension of the Museum will provide room for groups of African mammals, including elephants. The installation is geographical, i. e., as the visitor proceeds through the hall from south to north he meets the tribes that would be found in passing from south to north of Africa, and the west coast is represented along the west wall, the east coast along the east wall.

There are three aboriginal races in Africa: the Bushmen, the Hottentot, and the Negroes. In the north the Negroes have been greatly influenced by Hamitic and Semitic immigrants and become mixed with them.

At the south end of the Hall the wall is decorated with reproductions of cave-paintings made by the Bushmen, the most ancient and primitive of African natives. These works of art are remarkable for their realism, and should be compared with the reproductions of old European cave-paintings in the tower of the adjoining hall.

Nothing is more characteristic of the Negro culture, to which the rest of the Hall is devoted, than the art of smelting iron and fashioning iron tools. The process used by the African blacksmith is illustrated in a group near the entrance, on the west side, and the finished products, such as knives, axes, and spears, are amply shown throughout the hall. The knowledge of the iron technique distinguishes the Negro culturally from the American Indian, the Oceanian, and the Australian.

All the Negroes cultivate the soil, the women doing the actual tilling while the men are hunters and, among pastoral tribes, herders. Clothing is either of skin, bark cloth, or loom-woven plant fiber. The manu-

facture of a skin cloak is illustrated by one of the figures in the group to the left of the entrance; bark cloths from Uganda are shown in the northeastern section of the Hall; while looms and the completed garments are shown in the large central rectangle devoted to Congo ethnology. The most beautiful of the last-mentioned products are the "pile cloths" of the Bakuba, woven by the men and supplied with decorative patterns by the women. Very fine wooden goblets and other carvings bear witness to the high artistic sense of the African natives, who also excel other primitive races in their love of music, which is shown by the variety of their musical instruments.

A unique art is illustrated in the Benin case in the northern section of the Hall, where the visitor will see bronze and brass castings made by a process similar to that used in Europe in the Renaissance period. It is doubtful to what extent the art may be considered native.

The religious beliefs of the natives are illustrated by numerous fetiches and charms, believed to give security in battle or to avert evils. Ceremonial masks are shown, which were worn by the native medicine-men.

[*Return to Central Pavilion*].

SOUTH CENTRAL WING

Birds of the World

Birds of the World

Going north we enter the hall containing the general collection of birds. In the first four main cases on the right the 13,000 known species are represented by typical examples of the principal groups arranged according to what is believed to be their natural relationships. The series begins with the Ostriches, the "lowest" birds (that is, those which seem to have changed least from their reptilian ancestors), and goes up to those which show the highest type of development, the Singing Perching Birds such as our Thrushes and Finches. The remaining cases on the right wall and all of those on the left show the geographical distribution of the bird fauna of the world. The specimens are grouped according to their great faunal regions, the South American Temperate, American Tropical, North American Temperate, Arctic Eurasian, Indo-Malay, African and Australian realms. These cases in connection with the accompanying maps give opportunity for a comparative study of the birds of the different parts of the world. In each region, as in the Synoptic Collection, the birds are arranged in their natural groups to the best of our present knowledge.

THE DODO
Restored from Old Dutch Paintings.

Extinct Birds

Down the middle of the hall near the entrance are several cases containing birds which have become extinct or nearly so. The Labrador Duck, once a common visitor to our Long Island shores, became extinct for no known reason. The Great Auk and the Dodo were flightless species which bred in great numbers on small islands and were easily and quickly killed off by men. The Passenger Pigeon of North America lived by the million in such dense flocks that vast numbers were slaughtered with ease, but the last individual died in captivity Sept. 1, 1914. The Heath Hen formerly had a good range on our Atlantic seaboard, but as a game bird it was so continually persecuted, in and out of the breeding season, that it is

THE PTARMIGAN IN WINTER

One of a series of four small groups showing this bird's seasonal changes of color as brought about by molting and feather growth.

now extinct except for a few which survive under protection on the island of Martha's Vineyard. Specimens of all of these birds are shown here, the Dodo being represented by an incomplete skeleton and by a life-size reproduction copied from an old Dutch painting. Others of our splendid game birds, such as the Trumpeter Swan and Eskimo Curlew, are nearly, if not quite, gone and more, like the Wood Duck and Wild Turkey, will soon follow them if a reasonable close season and limited bag be not rigidly enforced. Still others—the beautiful Egrets and the Grebes, for example—have already gone far on the same road owing to the great demand for their plumage for millinery purposes.

Also down the center of the hall are several cases designed to illustrate the general natural history of birds.

General Topics

The widely different plumages (varying with age, sex, season, or all three) often worn by one species will be found illustrated in the Ptarmigan case and in the case containing Orchard Orioles, Snow Buntings, Scarlet Tanagers and Bobolinks. The relationship between structure and habits, the many forms of bill, feet,

LABRADOR DUCKS, NOW EXTINCT
From the Group in the American Museum.

wings, tail, etc., and the different ways of using them are illustrated in other cases, particularly by one showing the feeding habits of some birds.

Eggs

In the alcoves to the right the first egg case contains the Synoptic Collection of Eggs which shows the variation in the number in a set, size, shell texture, markings, shape, etc., and tells something of the laws governing these things. The succeeding cases contain the general exhibition collection of nests and eggs, principally those of North American and of European birds.

Birds of Paradise

Near the center of the hall is a nearly complete collection of the Birds of Paradise, presented by Mrs. Frank K. Sturgis. This family of birds is confined to New Guinea, Australia and some neighboring islands. Their feet and bills show their close relationship to the Crows and Jays, which they resemble in nesting habits as well. Their chief characteristic is of course their gorgeous plumes, wonderful as well in variety of form and position as in beauty. For these plumes the birds are still being killed in such large numbers that unless the demand for them soon ceases all the finer species will be exterminated, as the Great Bird of Paradise is already believed to be. More Birds of Paradise have been sold at a single London auction (23,000 in two sales) than are contained in all the museums of the world.

In this hall, too, are a number of groups of local and other birds which are placed here only temporarily. In fact, much of the arrangement of the hall will be changed as soon as circumstances permit.

Finback Whale

Suspended from the ceiling is the skeleton of a Finback Whale, sixty-two feet in length

THE BOWFIN GROUP

To illustrate the nesting habits of the bowfin or mudfish (*Amia calva*). At the left the male and female fishes are seen over a nest; at the right a male is standing guard over the eggs. The materials for the group were collected at Fowler Lake, Oconomowoc, Wisconsin, in May, 1912

CORRIDOR OF CENTRAL PAVILION

Recent Fishes

The exhibit of fishes occupies the center of the north end of the hall of the birds of the world and the corridor beyond the door leading to the gallery of the *Auditorium*.

The exhibit includes typical examples of the various groups of backboned animals popularly comprised in the term "fishes," and is arranged in progressive order. The visitor should first examine the case of hagfishes and lampreys facing the large window, near the end of the corridor. These rank among the most primitive "fishes." They are with-

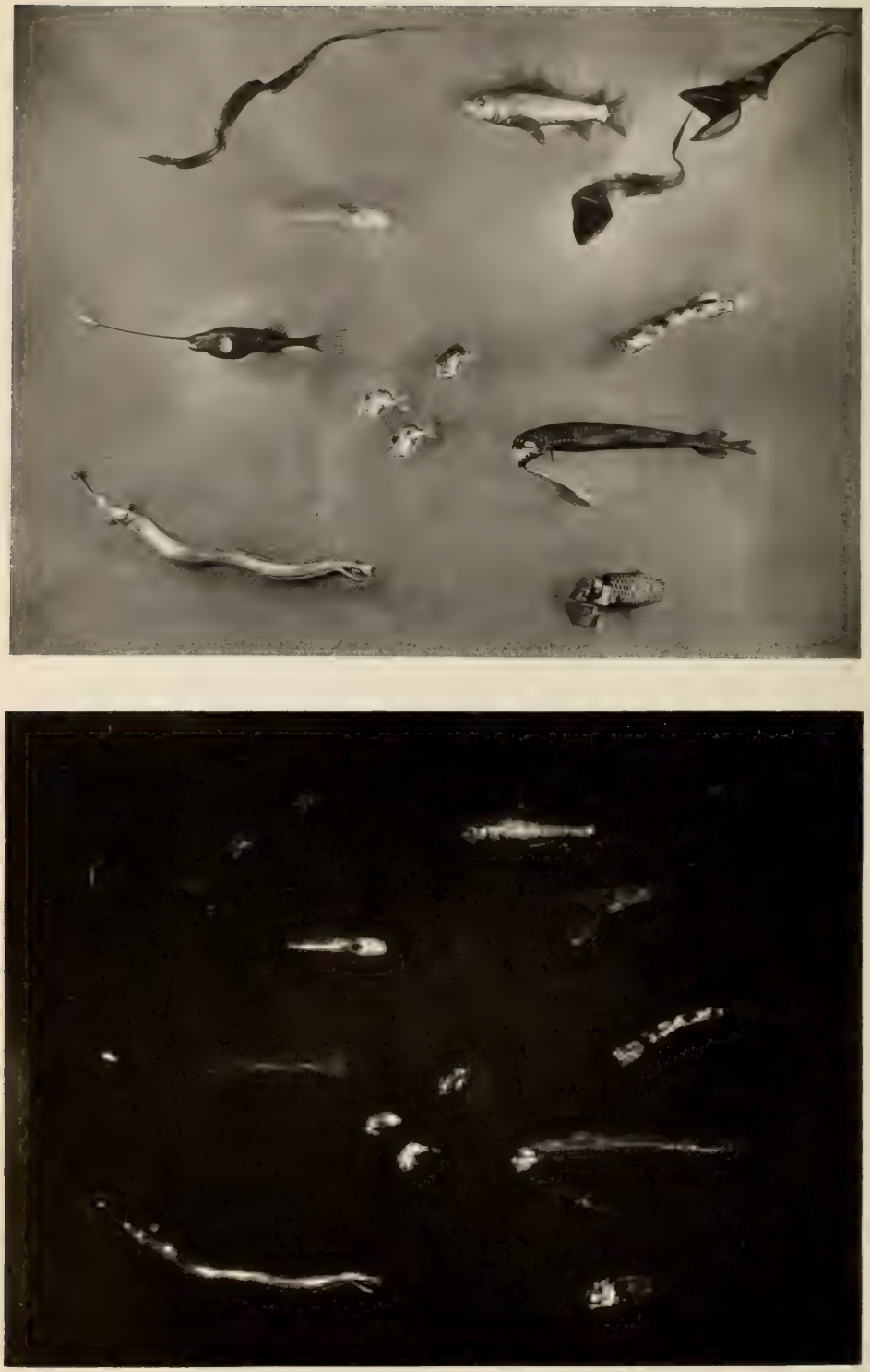
A PORTION OF THE PADDLEFISH GROUP

out scales, without true teeth, without paired limbs, and their backbone consists of but a rod of cartilage. One of the models shows the way in which a newly caught hag-fish secretes slime, forming around it a great mass of jelly. In the same case are lampreys, and one of them is represented attached to a fish, which it fatally wounds. The nest-building habit of lampreys is illustrated in a neighboring floor case: here the spawners are preparing a pit-like nest and carrying away stones, which they seize with their sucker-like mouths.

Hag-fishes and Lampreys

The visitor should next inspect the cases of sharks which are situated on the south side of the corridor. These include various forms of sharks and rays, selected as typical members of this ancient group—for the sharks have numerous characters which put them in the ancestral line of all the other groups of fishes.

Sharks



LUMINOUS DEEP-SEA FISHES

At the top as seen in daylight; below as they would appear in the deep sea by their own phosphorescence.

Next to be visited are the silver sharks of *Chimaeroids*, which are exhibited by the side of the lamprey case. They are now known to be highly modified sharks: their scales have failed to develop, and their heavy "teeth" appear to represent many teeth fused together. These fishes are now very rare and, with few exceptions, occur in the deep sea. The present models show the characteristic forms.

Lungfish

The adjacent case pictures the three types of surviving lungfishes, and the models are arranged to indicate the life habits of these interesting forms. Thus they are shown going to the surface of the water to breathe; and their poses indicate that they use their paired fins just as a salamander uses its arms and legs. In fact, there is reason to believe that the land-living vertebrates are descended from forms closely related to lungfishes. One sees in this case also a "cocoon", in which the African lungfish passes the months when the streams are dried up and during which time it breathes only by its lungs.

Returning again to the cases of sharks, one sees on a panel above them two huge sturgeons and two large gar pikes. These are examples of the group known as Ganoids,—fishes that represent, as it were, a halfway station between lungfishes and sharks on the one hand, and the great tribe of bony fishes on the other—such as perches, basses, cod, etc. A further glimpse of the Ganoids may now be had by viewing the spoonbill sturgeon (paddlefish) group, on the side opposite. In this group a number of these eccentric fishes are shown side by side with garpikes and other characteristic forms from the Lower Mississippi. This group was secured through the Dodge Fund. In the window are groups showing the shovel-nosed sturgeon, and the spawning habits of the bowfin and of the slender-nosed garpike,—all Ganoids.

Window Groups

Passing now through the door leading to the Bird Hall, we are confronted by a case containing additional examples of the Ganoids. Here one sees garpikes, sturgeons, the mudfish (*Amia*), together with the African Bichir, a curious Ganoid encased in bony scales and retaining structures which bring it close to the ancestral sharks.

Teleosts

The remaining cases in the center of the bird hall give characteristic examples of the various groups of modern "bony fishes," or Teleosts. There are fourteen cases of them in all, but they offer little space in which to illustrate the 10,500 species. For these are the fishes which are dominant in the present age, contributing over nine-tenths of all existing forms and including nearly all food and game fishes such as bass cod, eel and herring.

The cases should be examined in the order in which they are arranged;

and one may pass in review the catfishes, carps, eels, trout, salmon, pike, mullets, mackerel, basses, wrasses, drumfish, sculpins, cods, flatfishes and anglers.

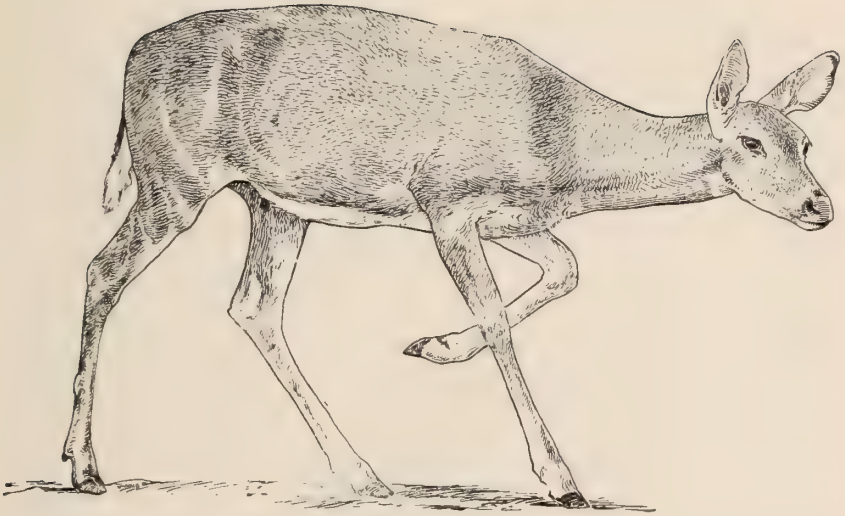
Deep-Sea Fishes

The end case exhibits the grotesque fishes from deep water, in which they occur to the surprising depth of over 3,000 fathoms, or more than 3½ miles. They are usually soft in substance, with huge heads and dwarfish bodies, and are often provided with illuminating organs like little electric bulbs, which can be "shunted" off or on by the fish, and enable the fishes either to see their neighbors or to attract their prey. A group representing a number of these fishes as they are supposed to appear in the gloom of the profound depths, lit up only by their luminous organs, is shown in an enclosure next to the Paddlefish Group mentioned above.

Before the visitor has completed his review of the hall, he should examine the two wall cases, on either side of the doorway, which explain the characteristic structures of fishes of different groups, and the way in which the groups are related to one another. In one of these wall cases various kinds of fishes have been arranged in a genealogical tree, and the lines and labels give an idea of their evolution.

[*Return to the Elevators.*]

CHIMÆRA, A DEEP SEA "SHARK"



THE VIRGINIA DEER—A CHARACTERISTIC NORTH AMERICAN MAMMAL

Line drawing from the mounted specimen. This Virginia doe stands as the first example in the Museum of the new methods of animal sculpture as opposed to the old taxidermy. It was mounted and presented by Carl E. Akeley in 1902.

SOUTHEAST WING

Mammals of North America

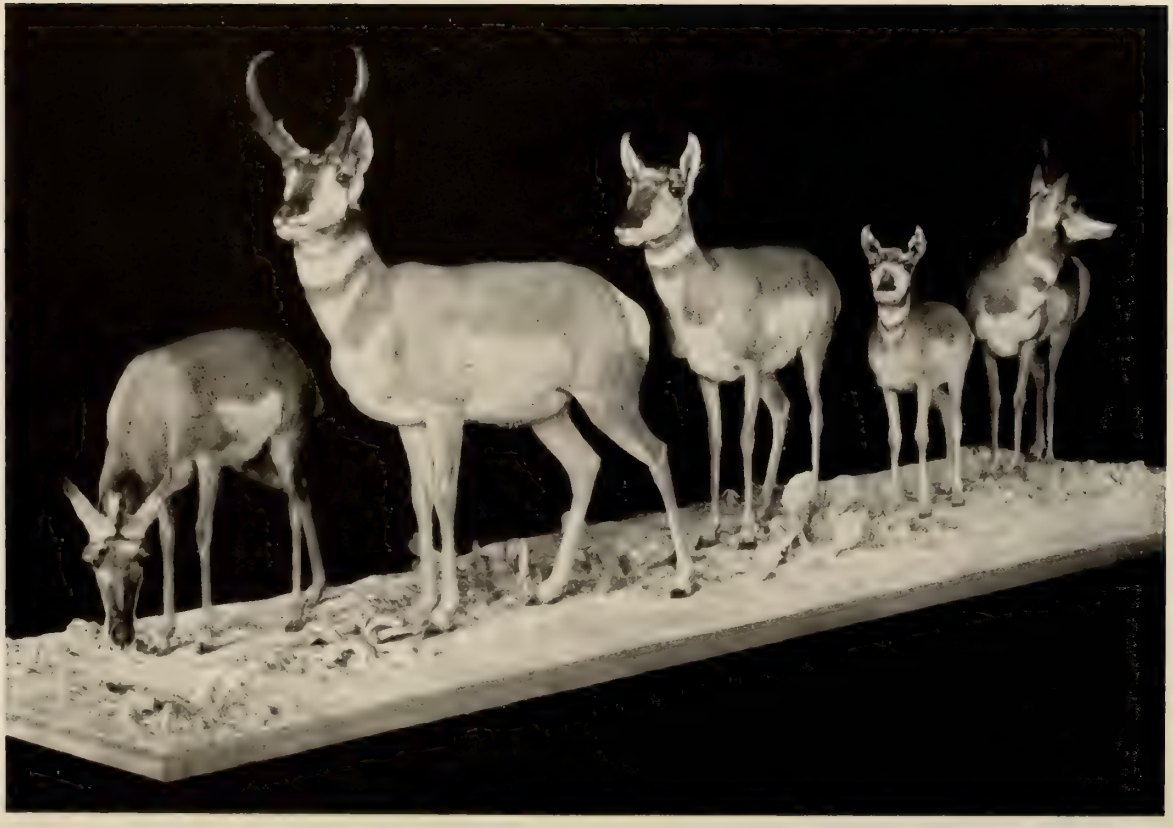
Continuing east beyond the elevator corridor, we enter the hall devoted to North American mammals, the first to catch the eye being the giant moose of Alaska. In the cases on the west wall and elsewhere are groups illustrating species found within fifty miles of New York City. One of these groups shows the opossum, the sole representative in the United States of the marsupial or pouched mammals. With what appear to be the head and ears of a pig and the prehensile tail of a monkey, with a strange pouch for the transportation of the young, and with proverbial cunning and remarkable tenacity of life, the opossum is one of the quaintest and most interesting of North American mammals. This is the animal so famous in the negro songs of the South.

Alaskan Moose

Opossum

Next is the raccoon, more commonly known as the "coon." It is nocturnal in habit and makes its nest in hollow trees. Two species of fox are shown, the red fox and the gray fox, both of which are justly famous for their sly cunning.

Raccoon
Foxes



A GROUP OF PRONGHORN ANTELOPE, SHOWING THE MANNER IN WHICH THEY WANDER ACROSS THE PLAINS

This animal is peculiar to North America and is the only hollow-horned ruminant in which the horn sheaths are shed yearly.

Skunk

The common skunk is a very useful although greatly abused animal. While it occasionally destroys poultry and other birds, its principal food consists of injurious insects and field mice. Its defensive weapon is an excessively fetid fluid secreted by a pair of glands situated near the base of the tail. It has the ability to eject this

THE WEASEL GROUP

One of the groups representing the small mammals found within fifty miles of New York City. The others of the series show opossum, raccoon, red and gray foxes, skunk, mink, muskrat, woodchuck, rabbits and squirrels. The list includes some "fur-bearing" species; weasel fur is often used instead of ermine.

fluid to a considerable distance. Its skin makes a valuable fur known as "Alaskan sable."

Mink and Weasel

Two other fur-bearing animals shown are the mink and the weasel, the latter in both its summer dress of dull brown and its winter coat of white. Weasel fur is often used in place of ermine.

Muskrat

Another fur-bearing animal shown is the muskrat. In the group are seen its summer home, usually a burrow in the bank of a stream or pond, and its winter mound, constructed of

FUR SEALS ON KITOVI ROOKERY, PRIBILOF ISLANDS

swamp grass and roots mixed with mud. Muskrats are extensively trapped for their fur and in 1913 no less than 4,500,000 were sold in London.

Brown Bat

A group of little brown bats shows about a hundred of these animals gathering in Wyandotte Cave, Indiana, for their long winter sleep.

BISON COW AND CALF

The big game of North America is described in Guide Leaflet No. 5, North American Ruminants.

Woodchuck

The woodchuck or ground hog is a vegetable feeder, but does very little harm to crops save clover. It hibernates for a large part of the year, usually from September to April. The old legend says that the ground hog comes out of his hole on the second of February, and if it is bright and he sees his shadow he goes back into his hole for six weeks longer and we may expect more cold weather. Other groups represent the varying hare and the common species of squirrels.

Hares and Squirrels

Moose Group

In the central section of the hall is a group of moose. It represents an early autumn scene in a second-growth forest in New Brunswick, and illustrates one of the favorite feeding grounds of the moose.

THE AMERICAN BEAVER

This shows the work and home life of the beaver. The old beavers are cutting trees for food and for building dams and houses In the foreground a house with part torn away to show the little beavers within

Bison Group

The buffalo group gives a typical bit of the prairie traversed by buffalo trails while the members of the herd represent different stages of growth of the buffalo. This is the animal which formerly roamed in countless numbers over the Western plains, but which is now reduced to a few insignificant herds.

In the center of the hall, too, is a group showing the color phases of our black bear, from which it appears that in a part of its range the black bear is literally a white bear.

Alaskan Brown Bear, Fur Seals

On the north side of the hall is a pair of the huge brown bears of Alaska, a family of fur seals from the Pribilof Islands and a family of Rocky Mountain goats.

Roosevelt Elk and Mountain Sheep

At the end of the hall is a group of Roosevelt elk found in the Coast Range from British Columbia to northern California. Once abundant, they have become much reduced in numbers, though an effort is now being made to preserve them. On the opposite side of the hall are the Mountain sheep or bighorns.

Beaver

Near by is a group of that interesting animal, the beaver, perhaps the most important of North American mammals and one intimately connected with the early history and exploration of this country.

Antelope Group

On the south side of the hall are displayed the cloven-hoofed animals of North America. These include sheep, musk ox, caribou, collared peccary and various species of deer. In one of the cases is a group of antelope showing the manner in which they wander across the plains.

Here too are, for the time being, shown the mammals of the polar regions, placed in the North American hall in order that the *Southeast Pavilion*, which once harbored them, may be used as a workroom for the preparation of a group of African elephants and other mammals from the dark continent.

Grant's Caribou Group

Grant's caribou inhabits the barren ground of the extreme western end of the Alaskan peninsula. The type specimen of this series is in the Museum.

Walrus Group

Near by is a group of the Atlantic walrus. These huge mammals are relatives of the seals, inhabit the waters of the Far North and are still fairly abundant along the shores of Greenland. The seal and walrus are the animals which play such an important part in the life of the Eskimo. From these animals come the principal food supply, skins for clothing, for fishing and hunting gear, boat covers, and harnesses for dog teams; from bones and tusks are made knives, bows, harpoons, and other hunting and cooking utensils.

Peary Musk Ox Group

The specimens in the musk ox group were collected for the Museum by Admiral Peary in 1896. Musk oxen inhabit the snow-covered wastes of the Arctic barrens, living mainly upon willow leaves, dug up from under the snow.

Note the various devices in the way of labels introduced to make the exhibits interesting and instructive. At the entrance attention is called to the principal causes influencing the distribution of mammals; on many of the labels are maps showing the range of the species shown, and near the group of mountain sheep is a label including a map and miniature models illustrating the species of North American mountain sheep and their range.

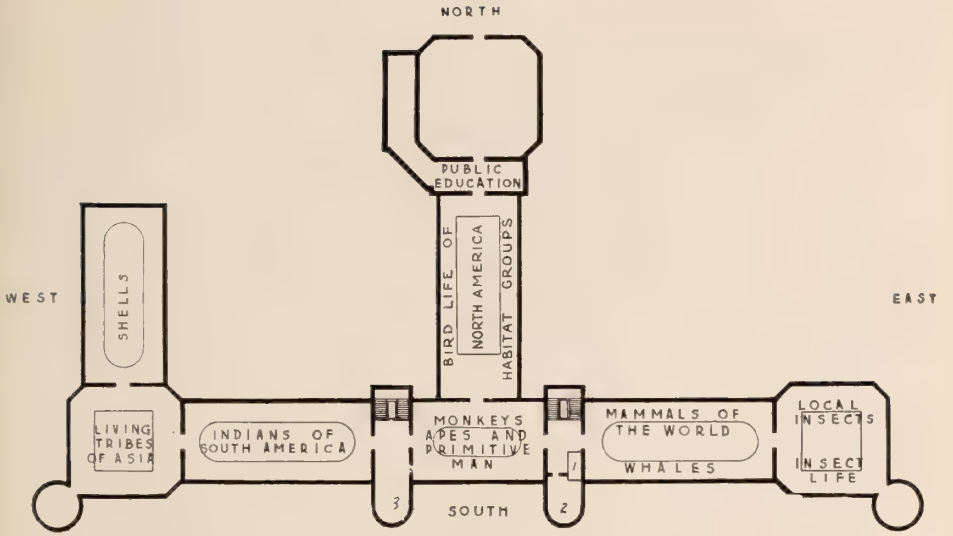
SOUTHEAST PAVILION

Being used as a workroom; see paragraph on preceding page.

Owing to the lack of an appropriation, no additions have been made to the Museum building for the past ten years, and although a new wing was authorized and the excavation for the basement actually made, work was stopped in 1912.

Owing to this fact, and the continued work of the Museum expeditions, all space in the Museum, and especially the storage rooms and work rooms, have become badly congested. When Mr. Akeley began the preparation of the group of African Elephants, intended as the central piece for the projected African Hall, it was necessary to clear out the Southeast Pavilion in order to provide necessary space; when the collections were received from the Congo Expedition, the collection of fishes was removed from the Central Corridor to the Bird Hall to furnish a little storage room. The beautiful Reptile Groups are installed in temporary quarters in the Central Pavilion, Second Floor, while nothing can be done toward exhibiting the collection of Mammals of the Sea, and the African Hall—the most beautiful and comprehensive museum exhibit yet devised—is still in the future.

[*Return to the Elevators.*]



THIRD FLOOR

EAST CORRIDOR

Members' Room

To the left of the elevators is a room set apart for the use of honorary or subscribing members of the Museum, where they may leave their wraps, rest, write letters, or meet their friends. Near by is a bronze tablet in memory of Jonathan Thorne, whose bequest provides for lectures and objects for the instruction of the blind.

SOUTH PAVILION

MONKEYS, APES, RODENTS, BATS

This is one of the halls in course of rearrangement and, in the final plan, is intended to include primitive man as well as the other members of the order Primates.

The family of orang-utans, on the south side, was one of the first groups of large animals to be mounted in this country, and was considered a daring innovation. Near by are examples of the gorilla, the largest and most powerful of the great apes, and the chimpanzee, which is the most like man in proportions and structure. "Mr. Crowley," one of the few full-grown apes that have endured captivity, lived for some time in the Central Park Zoo. Skeletons of man and the large apes illustrate the similarities and difference in structures between them, and these are supplemented by figures of some of the many races of man.

PHILIPPINE FRUIT BATS

Bats by Walter Escherich. Accessories by A. E. Butler

DUCK HAWK ON PALISADES OF THE HUDSON

Realism and artistic effect have been achieved in the "Habitat Bird Groups," and they present vividly many stories of adaptation to environment.

The bats, the only mammals that really fly, and rodents, the most numerous and widely distributed of mammals, are provisionally placed in this hall pending other arrangements.

Fruit Bats

The fruit bats, often known as flying foxes, the largest members of the order and found only in the warmer parts of the Old World, are represented by a small portion of a colony from Calapan, Philippine Islands. Such a colony may number several thousands, and be very destructive to bananas and other fruits.

Suspended from the ceiling in the center of the hall is the skeleton of a medium-sized North Atlantic right whale, a species once common on our coast, but now all but exterminated in the North Atlantic.

SOUTH CENTRAL WING

Bird Groups

Here are the "Habitat Groups" of North American birds. This unique series of groups shows the habits of some typical American birds in their natural haunts. The groups have been prepared under the immediate direction of Frank M. Chapman, curator of ornithology, who

THE ORIZABA GROUP

The observer is looking across the valley of the Rio Blanca, over the tropical forest, to Mount Orizaba

collected most of the specimens and made practically all of the field studies necessary for their reproduction. In the course of this collecting, he traveled more than 60,000 miles. The backgrounds are reproductions of specific localities, painted from sketches made by the artist who usually accompanied the naturalists when the field studies for the groups were made. Practically all sections of the country are represented, thus the series not only depicts characteristic bird life of North America, but characteristic American scenery as well. The backgrounds of the groups were painted by Bruce Horsfall, Charles J. Hittell, J. Hobart Nichols, Carl Rungius, W. B. Cox and Louis A. Fuertes. The foliage and flowers were reproduced in the Museum laboratories from material collected in the localities represented. Each group is fully described in the label attached to the case. [See *Guide Leaflet* No. 28.] Beginning with the case at the right of the entrance and passing on to the right around the hall, we find the groups arranged in the following sequence:

Orizaba Group

The distribution of birds, notwithstanding their powers of flight, is limited in great measure by climate. Thus in traveling from Panama north to Greenland there are zones of bird life corresponding to the zones of temperature. This condition is illustrated in the mountain of Orizaba in Mexico, where in traveling from the tropical jungle at its base to its snow-clad peak the naturalist finds zones of life comparable with those to be found in traveling north on the continent. Thus the Orizaba group so far as the distribution of life is concerned is an epitome of all the groups in the hall.

Cobb's Island Group

Among our most beautiful and graceful shore birds are the terns and gulls, which (because of their plumage) have been so ceaselessly hunted and slaughtered for millinery purposes that now in their breeding-places there are only hundreds where formerly there were thousands. The group represents a section of an island off the Virginia coast where the birds are now protected by law.

Duck Hawk Group

The duck hawk may be found nesting on the Palisades of the Hudson almost within the limits of New York City. It builds nests on the ledges of the towering cliffs. This hawk is a near relative of the falcon which was so much used for hunting in the Middle Ages.

Hackensack Meadow Group

In August and September the meadows and marshlands in the vicinity of Hackensack, New Jersey, are teeming with bird life. In the group showing these Hackensack meadows are swallows preparing to migrate southward, bobolinks or rice birds in fall plumage, red-winged blackbirds, rails and the wood duck.

The wild turkey is a native of America and was once abundant in the wooded regions of the eastern portion of the United States, but is

now very rare. It differs in color from the Mexican bird, the ancestor of our common barnyard turkey, which was introduced from Mexico in Europe about 1530 and was brought by the colonists to America. (Reproduced from studies near Slaty Forks, West Virginia.)

Wild Turkey Group

A PORTION OF THE EGRET GROUP

As shown here, the birds carry their plumes only during the nesting season; killing the parents means the slow starvation of the young.

Florida Great Blue Heron Group

The great blue heron usually nests in trees. The bird flies with its neck curved back on its body and because of this habit can readily be distinguished from the crane with which it is frequently confounded. (Reproduced from studies near St. Lucie, Florida.)

Water Turkey or "Snake-bird" Group

In the "bonnets" or yellow pond-lily swamps with cypresses and cabbage palmettoes, the shy water turkey builds its nest. It receives the name "turkey" from its turkey-like tail and the title "snake-bird" from its habit of swimming with only the long slender neck above water. (Reproduced from studies near St. Lucie, Florida.)

Sandhill Crane Group

The sandhill crane builds its nest of reeds in the water. Unlike the herons in this respect, it differs also in its manner of flight, always stretching its neck well out when on the wing. (Reproduced from studies on the Kissimmee Prairies of Florida.)

Pelican Island on the Indian River of Florida has been made a

reservation by the United States Government and these grotesque birds may now breed there undisturbed. The view shows a section of the island at the height of the nesting season. Notwithstanding the hundreds of young birds that are clamoring for food, observation has shown that the parent bird can pick out its own offspring with unfailing accuracy. (Reproduced from studies at Pelican Island, Florida.)

Brown Pelican Group

This beautiful bird has been brought to the verge of extinction in this country through the use of its "aigrette plumes" for millinery purposes, and is now confined to a few protected rookeries of the South. The birds have these plumes only during the nesting season, at which time the death of the parent means the starvation of the young. (Reproduced from studies in a rookery of South Carolina.)

Snowy Heron or Egret Group

The turkey vulture, or buzzard, is one of the best known birds of the South, where it performs a valuable service in acting as the scavenger of the streets. On this account it is protected by law and by public sentiment and has become both abundant and tame. (Reproduced from studies at Plummer Island in the Potomac River, near Washington.)

Turkey Vulture Group

The California condor is the largest and one of the rarest of North American birds. It is not so heavy as the condor of the Andes, but has a slightly greater spread of wing, eight and one-half to eleven feet. In the group the visitor is supposed to be standing in the interior of the cave where the bird has its nest and is looking down on the river of the cañon which is more than five thousand feet below. (Reproduced from studies in Piru Cañon California.)

California Condor Group

The foreground of the group shows a detail of the island that is painted in the background. The young birds are feeding, and it will be noticed that one fledgling is reaching well down the mother's throat after the predigested food. (Reproduced from studies at Monterey, California.)

Brandt's Cormorant Group

Formerly this area was an arid place with a characteristic desert bird fauna. Now the ranchmen have irrigated the land and aquatic bird-life abounds. This group is a good illustration of the influence of man on the bird-life of a region.

San Joaquin Valley Group

In the breeding season the flamingoes congregate in great numbers in their rookeries. There were estimated to be two thousand nests in this colony. The flamingoes construct their nests by scooping up mud with their bills and packing it down by means of bills and feet. The nests are raised to a height of

Flamingo Group

A FLAMINGO COLONY IN THE BAHAMAS

A "city" of these birds is the most remarkable sight in the world of birds. The mud nests are raised from eight to fourteen inches, and thus protected during rise of water.

twelve or fourteen inches; this protects eggs and young from disasters due to high water. Only one egg is laid in the nest, and the young is born covered with down like a young duck and is fed by the mother on predigested food. The brilliant plumage of the adult is not acquired until the fifth or sixth moult. (Reproduced from studies in the Bahama Islands.)

Booby and Man-of-War Bird Group

In this group is shown a portion of a coral islet on which three thousand boobies and four hundred man-of-war birds were nesting, the former on the ground, the latter in the sea grape bushes. (Reproduced from studies in the Bahama Islands.)

Florida Rookery Group

The abundance of bird-life in one of these rookeries is quite astounding. In this group are roseate spoonbills, snowy egrets, American egrets, little blue herons, Louisiana herons, ibises, cormorants, and water turkeys. Because of the great inaccessibility of this island it has been one of the last places to escape the depredations of the plume-hunter. (Reproduced from studies in the Everglades of Florida.)

Golden Eagle Group

The golden eagle is one of the most widely distributed of birds. In North America it is now most common in the region from the Rockies to the Pacific Coast, although it is found as far east as Maine. Stories to the contrary notwithstanding, the eagle never attacks man, even though the nest is approached.

Its food consists of rabbits, squirrels, woodchucks, and occasionally sheep. (Reproduced from studies near Bates Hole, Wyoming.)

The abundance of bird life in this western lake beneath Mt. Shasta, which is seen in the center of the background, is astonishing.

Whistling Swan and Whooping Crane

These two groups have recently been added, though provision was made for them in the original plans for this gallery. The whooping crane was exterminated so rapidly that not only was it impossible to obtain a nest and young, but it was necessary to use old birds taken many years ago.

Klamath Lake Group

Here is an example of how the normal nesting habits of a bird may be changed by its being driven into a different locality. In the group are white pelicans which usually make a nest of pebbles, Caspian terns which commonly build their nests on sand, and cormorants that nest on rocks, all nesting together here on the tule or rush islets of the lake. (Reproduced from studies at Klamath Lake, Oregon.)

Arctic-Alpine Bird Life Group

The scene represented in this group is above timber line on the crest of the Canadian Rockies, 8,000 feet above the sea. Although these mountains are in the temperate region, the altitude gives climatic conditions that would

Love making of the prairie chicken In this position and with orange-like air sacks inflated, he produces a booming sound which may carry a distance of two miles.

be found in the Far North, and the bird life is arctic in character. Here are nesting the white-tailed ptarmigan, rosy snow finches and pipits. (Reproduced from studies in the Canadian Rockies.)

Sage Grouse Group

This group shows a stretch of Western plateau covered with sage bush. In this bush is seen the male sage grouse strutting and wooing a mate. (Reproduced from studies at Medicine Bow, Wyoming.)

Prairie Chicken Group

The prairie chickens are akin to the common grouse. The group represents a typical scene during the mating season. The male birds go through most surprising antics in their efforts to attract the females. They inflate the orange-colored sacs on the sides of their necks, dancing and strutting about and uttering a loud, resonant, booming note. (Reproduced from studies near Halsey, Nebraska.)

Wild Goose Group

The wild goose is one of the first birds to migrate north in the spring. It nests in the lakes of Canada even before the ice is melted. To secure the young birds for this group it was necessary to hatch the eggs of the wild goose under a hen, so difficult is it to find the young in nature. (Reproduced from studies made at Crane Lake, Saskatchewan, Canada.)

Grebe Group

The grebe is another of our aquatic birds which builds its nest near the water. During the incubation period the parent bird usually covers the eggs with grass and reeds when leaving the nest. Nesting at the same lake with the grebe was the redhead duck, which lays from fifteen to twenty eggs. (Reproduced from studies made at Crane Lake, Saskatchewan, Canada.)

Loon Group

The loon is justly famed for its skill as a diver, and can swim with great speed under water. Its weird call is a familiar sound on the northern New England lakes. Many loons pass the winter at sea fifty miles or more from

land. (Reproduced from studies at Lake Umbagog, New Hampshire.)

Bird Rock Group

This rocky island thirty miles from shore in the Gulf of St. Lawrence affords some protection to the sea birds which still nest in great numbers on and in its cliffs, although the colony is a mere shadow of what it was even fifty years ago. Seven species are shown nesting in the group. Namely the razor-billed auk, petrel, gannet, puffin, kittiwake gull, common murre and Brunnich's murre. (Reproduced from studies at Bird Rock, Gulf of St. Lawrence.) This was the first habitat group.

[*Return to the South Pavilion containing the apes and monkeys.*]

WEST CORRIDOR

Public Health

Returning to the South Pavilion where the monkeys are, and passing to the right, we enter the *West Corridor* containing the exhibits of the Department of Public Health.

The Hall of Public Health is dominated by a bronze bust of Louis Pasteur, the founder of scientific bacteriology and preventive medicine, which was presented to the Museum through the courtesy of the Pasteur Institute of Paris. Near the head of the stairway is a reading table where pamphlets bearing on insect-borne disease and other public-health problems may be consulted.

Water Supply

The first section of the exhibit deals with the natural history of water supply as it affects the life and health of man. The large frieze at the entrance to the corridor on the left illustrates the primary source of water supply, the sea, the clouds, and the secondary sources, rivers and lakes. Diagrams, models, and a relief map show the variations in rainfall at different points in the United States. Relief maps of the region about Clinton, Massachusetts, before and after the construction of the Wachusett Reservoir for the water supply of Boston, show the way in which surface water supplies are collected by impounding streams, and a model of a well sunk through impervious clay or rock down to water-bearing strata shows how ground-water supplies are obtained. A series of samples and models illustrate the variation in composition which occur in natural waters, from the swamps of Virginia to the deep wells of Iowa and the turbid rivers of the Ohio Valley.

Some of the principal micro-organisms, Algæ and Protozoa, which grow in reservoirs and impart tastes and odors to water are represented

THE HOUSEFLY OR TYPHOID FLY

Modeled 64,000 times the bulk of a fly. By Ignaz Matausch from his original studies.

by a series of glass models. The effect produced by the pollution of water by disease germs is illustrated by relief maps and diagrams showing the course of famous typhoid and cholera epidemics. Models are displayed which illustrates the purification of water by storage, filtration, and disinfection, the filter model being an elaborate representation of the plant at Little Falls, N. J. Diagrams indicate the results of water purification as measured in the saving of human life. Finally a series of five large relief maps show the growth and development of the water supply of New York City.

Disposal of City Wastes

Following the water-supply exhibit is a series of models illustrating the dangers from improper disposal of the liquid wastes of the city and how they may be avoided. Actual points of danger in the neighborhood of New York are shown where polluted harbor waters, bathing-places, and shellfish beds constitute a menace to health. Modern methods for the treatment of sewage on scientific lines are illustrated by a series of models of screens, sedimentation tanks, and filter beds of various types.

Bacteria

The cases near the window are devoted to the group of Bacteria, especially in their relation to human life. Glass models show the various shapes and relative sizes of these minute forms, and in particular of the principal types which cause disease. In a nearby case are displayed actual colonies of a number of species of bacteria, including some which produce disease and others which are beneficial to man by their effect upon soil fertility or from the fact that they may be utilized in the production of substances useful as foods or in the arts. A group of transparencies at the window shows some of the more important disease bacteria as they appear under the microscope.

Insects and Disease

Another series of exhibits deals with the transmission of disease by insects, notably by the fly and flea and by the mosquito. The most striking features are greatly enlarged models of the fly, the flea, and the louse. These, the finest models of the kind ever made, were prepared by the late Ignaz Matausch from his original studies, and required several years of constant, exacting labor.

The egg, larva and pupa of the fly, and the eggs of the louse are also shown.

Models in the wall case deal with the life history of the fly, showing its various stages in their natural size and actual habitat, and illustrate the large numbers of flies which may breed in a single pound of manure and the enormous progeny which may spring from a single pair and their descendants during the breeding season.

The deadly work of the fly in carrying typhoid fever is illustrated by

graphic presentations of typhoid statistics of the Spanish-American War and of the relation between flies and "summer disease" of children, as worked out by the Association for Improving the Condition of the Poor in New York City.

Nearby are two models showing unsanitary and sanitary conditions on a small farm. In one, pools of stagnant water and uncovered manure heaps and general uncleanliness favor the breeding of mosquitoes and flies, while the open doors and windows give these insects free access to the house. In the other, the swampy land is drained and cultivated, the windows screened, the shallow dug well replaced by a driven well; the conditions are sanitary, and health and prosperity replace sickness and poverty.

Various types of traps for larvæ and adult flies are shown with models illustrating how fly-breeding may be prevented, how human wastes may be protected from their access, and how manure may be cared for so as not to be a medium for breeding flies.

A wall case on the right of the entrance to the hall shows a group of the natural enemies of the fly: the cock, phebe, swifts, the bat, spiders and centipedes, in characteristic surroundings as they may be seen in the corner of a New York State farm on a late August afternoon.

The Flea and Bubonic Plague

The relation of the flea and the rat to the terrible disease bubonic plague is illustrated in considerable detail. Wall charts picture the spread of the great historic epidemics of this disease, and reproductions of sixteenth and seventeenth-century drawings show with what terror the Black Death was regarded in pre-scientific days. The chief carrier of the disease, the flea, is shown in a remarkable model, 120 times the length of the actual insect, and having the bulk of 1,728,000 fleas, prepared by Ignaz Matausch.

Specimens of some of the principal animals which harbor the plague germ and serve as reservoirs from which it is carried by the flea to man (the black, brown and roof rats, the wood rat and the California ground squirrel) are shown, and the manner in which the disease is disseminated is illustrated by a copy of a corner of a rat-infested house in California. The original from which this was copied, as well as many of the rats and squirrels, were obtained through the courtesy of the U.S. Public Health service of Washington. A habitat group shows a typical family of ground squirrels on a rocky hillside in central California, during the breeding season in May. Preventive measures used against the plague are illustrated by models of a farm with buildings rat-proofed, of a rat-killing squad, equipped for work in San Francisco, of a ship at dock with rat-guards to prevent the access of rats to the shore, and by specimens of various types of rat traps.

Mosquitoes and Other Insect Carriers of Disease

In a window case are shown various stages of the common mosquito, Culex, as well as of Anopheles, the carrier of malaria, and Aedes, which is responsible for the spread of yellow fever. In the same case are specimens of other insect carriers, such as the flea, the bedbug and the louse. Small cases flanking the windows contain specimens of the Glossinas which transmit sleeping-sickness and the Nagana disease in Africa, and of the ticks which spread Texas fever of cattle and relapsing fever, African fever, and Rocky Mountain spotted fever of man. Nearby are shown maps indicating the area affected by the principal tick fever in the United States and a model of a dipping vat used in freeing animals from tick infestation.

Mosquitoes and Malaria

A series of models and diagrams is devoted to the life history of the Anopheles mosquito and its relation to malaria. A relief map of the State of Arkansas illustrates the coincidence between low swampy lands and the prevalence of malaria, and another shows the heavy incidence of malaria in the vicinity of marshlands near Boston. A small relief map indicates the type and arrangement of drains used for lowering the water level and eliminating mosquito-breeding pools, and diagrams illustrate the progress made in mosquito control in New Jersey and the financial return which has resulted.

Malaria and Yellow Fever

A wall case devoted to the natural history of the mosquito illustrates the world distribution and seasonal prevalence of malaria and yellow fever in relation to the habits of their mosquito hosts, the breeding-places of mosquitoes, the life history (shown by specimens) and the money cost of malaria to the United States. Here are also shown some of the practical methods of control by ditching, oiling, stocking with fish, and encouraging enemies such as the bat, bite cures, and repellents and finally the practical results in the reduction of malaria which have been obtained in Italy.

Control of Mosquito-borne Disease

A second mosquito case contains a series of small-scale models, attractively worked out by Otto Block, illustrating some of the methods and results of tropical sanitation as applied to the mosquito-borne diseases, malaria and yellow fever. A hospital at Panama is shown as it was during the French régime with mosquito-breeding pools all about and with the legs of the beds and the flower pots set in dishes of water to keep off the ants. In contrast there is illustrated a modern hospital with all stagnant water removed, and wards screened and ventilated. Other models show the sanitary squads on the Isthmus which fought the yellow-fever mosquito in the town by fumigation, and the malarial

mosquito in the country by ditching and oiling. The same case contains oil paintings of the completed canal and of the camp near Havana where the secret of the transmission of yellow fever was discovered and the foundations of tropical sanitation laid in 1900. Photographs of the four American Army officers, Reed, Carroll, Lazear, and Agramonte, to whose researches this advance is due, are hung upon the wall nearby.

Military Hygiene

One wall case is devoted to the subject of military hygiene, which has become of such immediate moment and has, on the whole, been so successfully solved during the Great War. Diagrams illustrate the relative deadliness of disease germs and bullets in earlier wars; and their lesson is reinforced by a representation of the relative importance from injuries in action and from typhoid fever during the Spanish War. One company, confronted by a cannon, suffers the loss of one man wounded, while the other, facing a tube of typhoid germs, has one dead and thirteen in the hospital. Other models show how camp wastes are disposed of, and how water supply is sterilized, and still others, how the soldier's tent is protected against mosquitoes and how a field hospital is equipped. The field ration of the soldier and the preparation of anti-typhoid vaccine are illustrated by specimens and models.

Vital Resistance and Disease

Two tree trunks, one normal and the other infested with fungi as a result of mechanical injury, illustrate the important fact the the normal plant or animal is able to resist disease, while anything which tends to lower vital resistance may open the way for the invasion of pathogenic germs.

Audubboniana

The collection of Audubboniana, or objects relating to the life and works of John J. Audubon, presented to the Museum by his granddaughters, Maria R. and Florence Audubon, occupies the stairway hall. It includes original sketches and paintings by Audubon and his sons, illustrations in various stages from the Quadrupeds of North America, and some of the copper plates of the "Birds of North America." The most important piece is a large painting of a covey of "English" pheasants, flushed by a dog. Of more personal interest is the gun carried by Audubon on many of his expeditions and a favorite buckskin hunting coat.

SOUTHWEST WING

Indians of South America

Passing through the west corridor, where the exhibit of the Department of Public Health is installed, and on into the adjoining hall to the west, we find the collections from South America. The greater part of the hall is filled with archæological material illustrating the various forms of culture existing in Colombia, Ecuador, Peru, Bolivia, and Chile in prehistoric times. The remains found in Peru, in parts of Central America, and in Mexico

Indians of South America

PIECES OF CLOTH FOUND WITH PERUVIAN MUMMIES

The prehistoric Peruvians were familiar with modern weaves, including the finest gobelins and produced highly decorative effects by harmonized colors and a repetition of woven-in designs. The Museum's collection of mummy cloths is one of the largest in the world, and is much used by teachers and students of art.

show a degree of culture far in advance of that attained in any other part of this continent in prehistoric times. Unlike the ancient peoples of Mexico and Central America the Peruvians had no written language. They were tillers of the soil and raised maize, potatoes, oca, quinua, beans, coca, and cotton. The Incas domesticated the llama, which was used as a beast of burden. They excelled in the manufacture and decoration of pottery vessels, in metal work, and in textile fabrics. In the case

PERUVIAN MUMMY BUNDLES AND MUMMY

The ancient Peruvians wrapped their dead in fabrics of fine cotton and wool, then covering with a sack of strong cloth. The mummy "bundle" thus produced was often given a "false head" of cloth filled with cotton or vegetable fibre. Climatic conditions in Peru have preserved these mummies and their wrappings during many centuries.

directly in front of the entrance are displayed gold and silver objects, such as beads, cups, pins and ear ornaments, which show the high degree of skill attained in the beating, soldering and casting of metals. In weaving they were perhaps preeminent among prehistoric peoples, many of their specimens exhibited here being unsurpassed at the present day. The materials used were cotton and the wool of the llama, alpaca, and vicuna. In the first cases on the right are examples of these textiles with looms and shuttles. [The musical instruments of ancient Peru are discussed in *Guide Leaflet* No. 11.]

Gold and Silver

Textiles

The alcove cases are geographically arranged, showing exhibits from the north toward the south of South America, then up into the interior of the continent. In the wall cases extending across the entire western end of the hall will be found a remarkable collection from Nazca, Peru. The prehistoric people of Nazca excelled as colorists, particularly in the decoration of their pottery vessels, which are certainly the most beautiful so far discovered in South America.

On the south side of the hall is shown a collection from Ica, Peru. In this exhibit are some rare and beautiful shawl-like garments of these prehistoric people, in a good state of preservation.

The special exhibits in the gallery rail cases include quipus used to keep

AN EXAMPLE OF NAZCA POTTERY

TREPHINED SKULLS FROM PREHISTORIC PERUVIAN GRAVES

accounts, charms and medicines, coca which was chewed with lime, and shells that were found in mummy bundles and in the graves. A number of the chicha jars are on exhibition on top of the cases.

Trephined Skulls

In the first case to the left (south side) is a collection of skulls showing many examples of trephining, artificial deformation, and pathological conditions, together with a number of normal Peruvian skulls for comparison.

Mummy Bundles

The wall case at the left of the entrance contains mummy bundles and various objects showing the burial customs of the Peruvians. In no part of America are found so many and so extensive burial places as in the coast region of Peru. Here were interred countless thousands of the ancient dead. In the *huacos* or graves, with the bodies, were placed such articles as had been most useful and highly prized during life, and such as it was considered would be most serviceable in a future life.

To this custom we are indebted for no small part of our knowledge of the daily life of the ancient Peruvians. From the mummy bundles and graves all the objects in the extensive collections in this hall, illustrating their civilization, have been obtained. The wonderful state of preservation shown in the textile fabrics and other perishable materials from the coast regions is due to the extreme dryness of the climate and the nitrous character of the soil. [See *Guide Leaflet* No. 24.]

Chilean Mummy

The mummy in the case at the west end of the room was found in a copper mine at Chuquicamata, Chile. The body is that of and Indian miner who was killed by the falling in of rocks and earth while engaged in getting out the copper ore (atacamite) used by the Indians in making implements and ornaments in prehistoric times. The tissues of the body have been preserved by copper salts with which it is impregnated. The implements he was using at the time of his death are shown beside him in the case.

On the south side of the hall are the ethnological collections from Brazil, British Guiana, Paraguay and Colombia. War implements, basketry, featherwork, and musical instruments, etc., are arranged in these cases.

SOUTHWEST PAVILION

Chinese and Siberian Collections

If we pass on into the hall at the extreme west end of the building, we find collections from eastern and northern Asia. The arrangement is geographical. Specimens illustrating the culture, industries, religion, and manufactures of China are on the left; others showing the mode of living, the costumes, and the war implements of Siberia are on the right. The furwork, cos-

Collections from Asia

ANCIENT CHINESE BRONZES

tumes, and rugs of the people of East Siberia reveal remarkable skill in workmanship. Two models show respectively summer and winter scenes in Siberia. A small model in one of the cases to the left shows the manner of making pottery. A series of frames in the rear contain pieces of various kinds of fabrics and patterns illustrating weaving and woodwork ornaments.

The collections deal mainly with the every-day life of the modern Chinese and have a special value, as they were made just before the sweeping changes of the last few years took place. These abolished many of the customs in which these objects were used; for example, the series of weapons and objects showing the tests to which a soldier was submitted on entering the army have been rendered obsolete

BLACK HELMET OR CAMEO SHELL

From the Morgan Collection

by the introduction of modern weapons and tactics. Bamboo, porcelain, basketry, inlaid work, cloisonne enamel, agricultural implements, carvings in wood, ivory, and stone, and embroidery are shown to advantage.

A special collection of great value is found in the ancient bronzes and pottery shown in the adjoining tower room.

WEST WING

Shells

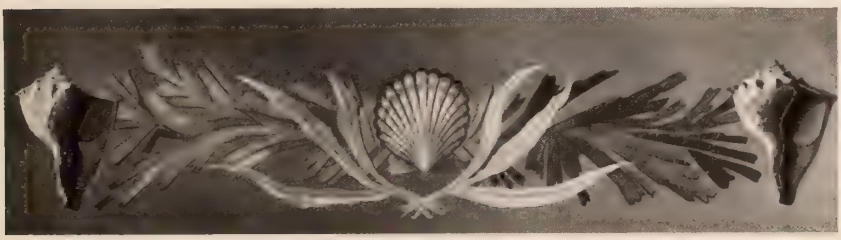
The collection of shells installed in the *West Wing* contains altogether about 100,000 specimens representative of nearly 15,000 species. These show extraordinary range of color and ornamentation. The arrangement of the collection is as follows: first, in the south wall cases a series showing briefly the classification of mollusks; second, in the eight table cases at the north and south ends of the hall the collections of land shells; third, in the upright railing cases the bivalves or mollusks which have two shells like the common clam; fourth, in the metallic cases the univalves, mollusks which have only one valve or shell like the snails; fifth, special exhibits of shells in the north wall cases. Other cases contain exhibits illustrating the anatomy and habits of mollusks; colored transparencies show them in their habitats.

Facing the entrance is a huge shell of the giant clam, *Tridacna*, measuring 43 by 27 inches and weighing 579 pounds, one of the largest examples on record.

Short descriptive group labels will be found in the cases, and on the walls, picture labels of important families of shells, together with small Maps of Distribution defining the occurrence of the same throughout the world.

An interesting collection of deformed shells is seen in the north case, and a series illustrating the ornamental uses of shells. Cases of especial beauty in their shell contents are those holding *Murex*, *Fusus*, *Volute*, *Conus*, *Oliva*, *Strombus*, *Cypraea*, *Nistra*.

[*Return to the South Pavilion, containing the apes and monkeys.*]



DECORATION FROM THE SHELL HALL

SOUTHEAST WING

Mammals of the World

Continuing east from the hall where the apes and monkeys are, we pass the elevators, to enter the hall of the *Southeast Wing*, devoted mainly to a series of exhibits illustrating the characters of mammals, their principal groups, or orders, the main sub-divisions of these, known as families, and various interesting peculiarities of habits and structure. Walking around the room from left to right one passes from the egg-laying Platypus to man, represented by the figure of an Australian native, armed with the characteristic boomerang. Incidentally one sees the modifications of form and structure for various modes of locomotion, notices the superiority in brain of mammals over other vertebrates, learns that animals that outwardly look alike may be very distantly related, sees illustrations of albinism and melanism, and is shown how the coat of the hare changes from brown to white.

Above the cases is a frieze representing marine scenes, which serves as a background for groups of porpoises, dolphins, and other small members of the whale family. The most striking object in the hall is the life-size model of a sulphur-bottom whale, seventy-nine feet in length.

Model of Sulphur-bottom Whale

The original of this specimen was captured in Newfoundland, and the model is accurately reproduced from careful measurements. This huge creature is not only the largest of living animals, but, so far as we know, the largest animal that has ever lived: a specimen of this size weighs from sixty to seventy tons, about twice as much as *Brontosaurus*. As can be seen by examining the models of a whale's head attached to the pillar, the whalebone which takes the place of teeth hangs in great plates from the inside of the upper jaw. This whalebone acts as a strainer in the mouth of the whale, and extracts the small animals from the sea water which the whale takes into his mouth when feeding. The food consists mostly of tiny crustaceans less than an inch in length. Although whales and porpoises live in the water, they are not fishes, but are warm-blooded and breathe by means of lungs, not gills. The whale must come to the surface to breathe and the so-called "spouting" is merely the result of the warm air being expelled from the lungs when he breathes. A whale does not spout *water*, as is commonly supposed. Models to scale of the other whalebone whales, and the toothed sperm whale, and reproductions of smaller whales and porpoises are hung near for comparison.

The plans for the next addition to the Museum building include a large hall to contain whales and other marine animals.

In the railing cases are exhibits which aim to give the visitor a general view of the enormous class of insects. This series is, at present, being extended and improved. When finished, it will include representatives of all the principal families, exotic as well as native. A special exhibit of the common butterflies near New York City and another of the "Moths of the Limberlost" have been installed. There is also one showing butterflies found in North Temperate America. There are nearly half a million species of insects in the world so that, even when finished, this series can contain only a small part of the total. Furthermore, many of the species would fade rapidly if exposed to the light. The general study collection of insects is on the fifth floor, and while it is not on exhibition, the curators will be glad to show it to visitors who can make use of it. See the Southeast Pavilion for the study collection of local insects.

SOUTHEAST PAVILION

Hall of Insect Life

Proceeding east, we enter the *Insect Hall.* The installations in this hall point out the relationships, through origin and mode of life, of insects to each other and to the other members of the Animal Kingdom, especially to man. The exhibits are arranged in a continuous series, and are numbered so that we can easily follow the plan beginning at the pillar farthest to the left and making two complete circuits of the hall.

Insect Life

First is an introductory section illustrating by diagrams the importance of insects as shown (a) by the large number of species compared with other animals [there are more species of insects than of all other animals put together] and (b) by their great influence on human interests. In the United States, the economic loss by insects is more than five times as great as by fire, and there are more than twelve times as many deaths from insect-borne diseases as from railroad accidents. On the other hand, many of our crops and all beautiful flowers are largely dependent upon pollination by insects.

Importance of Insects

Following this are a number of sections illustrating the anatomy of insects, explaining the terms used in the classification of insects, and exhibiting typical examples of the principal families.

Classification of Insects

GROUP OF MIGRATORY BUTTERFLIES

General Information

After a number of sections devoted to general phases of entomology such as the relationships of insects to each other and to other invertebrates, the color of insects, the four stages of an insect's life history, and the seasonal activity of insects, a series of exhibits is given which shows the principal insects of special situations and plants. Under the former heading we note aquatic insects and those associated with decaying material.

The exhibits concerned with insects associated with special plants lay emphasis upon those of economic importance and are followed by a study of household insects, insects and disease, and insecticides. It is shown that man's efforts to combat noxious insects is supplemented by the activities of lower mammals, birds, fish, reptiles, and of insects themselves.

Although certain insects destroy plants, some plants destroy insects. These and other ecological interrelations of insects and plants, including pollination, are shown on the east side of the hall.

Occupations of Insects

Among insects are found carpenters, masons, weavers, papermakers, and other sorts of laborers. The making of silk is one of the principal insect activities, and several sections are devoted to silk, looking at it from both the entomological and the human viewpoints.

PART OF THE CICADA GROUP

Following this, such subjects as art, the Bible and other literature, medicine, and superstition in their relation to entomology are treated. Photographs and short biographies of prominent entomologists of the past are given.

Evolution is a large subject, but the principal points involved in the present-day theories are illustrated in a series of sections treating

such problems as mimicry, protective coloration, adaptation, variation, mutation, geographic distribution, selection, and inheritance (Mendelism).

Evolution of Insects

The north side of the hall is devoted to social insects and their relatives. Here are found several groups showing the activities of these interesting creatures.

The final series includes a variety of things, being answers to the questions most frequently asked the curator by the general public.

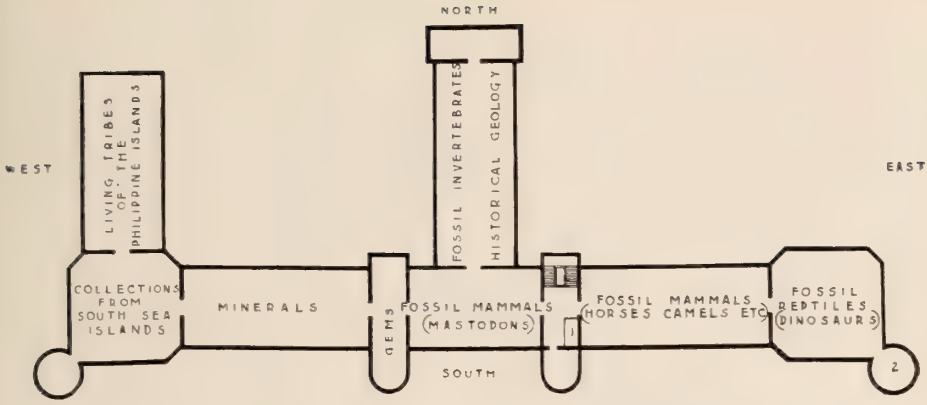
Visitors desirous of studying the local insects more in detail are cordially invited to do so by consulting the nearly complete collection to be found in this hall under the custody of the New York Entomological Society.

Local Collection

It is primarily intended to be an aid in identification of specimens and is not a part of the general exhibition series.

[*Return to the elevators and ascend to the Fourth Floor.*]

ONE OF OUR COMMON HAWK MOTHS



1. Elevators
2. Fossil Fishes

FOURTH FLOOR

Foreword on Fossil Vertebrates

In the *East Corridor*, and the *South Pavilion* at the left, as well as in the *East Wing* and *Southeast Pavilion* at the right, are displayed the fossil mammals, reptiles, and fishes.

In a general way, fossils are the petrified remains of plants or animals that lived at some past period of the earth's history. In many instances we have not the objects themselves, but only their casts or impressions in the rocks. This is particularly the case with shells. Sometimes, as with the bones of the great Irish elk, the objects have been buried in swamps or bogs, and in a few rare instances, as with the mammoth and woolly rhinoceros, entire animals have been preserved for thousands of years in ice or frozen mud. Fossils are found in localities where the dead animals or plants have gradually been buried under layers of sediment to such a depth that they come in contact with the mineral waters of the earth and finally become petrified. Later through subsequent upheaval and erosion they are again brought to or near the surface of the earth. Petrifaction is the slow replacement of animal or vegetable material by such minerals as carbonate of lime or silica. The process is very slow and for this reason flesh is never petrified. Fossil beds are found in every continent. In our own country, Texas, Montana, Wyoming, and the Bad Lands of South Dakota are famous for their large fossil beds, and many of the finest and rarest fossils in the Museum were obtained in these localities.

As it takes thousands of years for the various layers of earth to accumulate over the bones, and for the latter to become petrified, the study of fossils and the strata in which they are found is an important aid in determining the age of the earth and the succession of life thereon.

Many of the skeletons exhibited in these halls are of animals which lived from 30,000 to 20,000,000 years ago. To prepare a specimen for exhibition the matrix in which the bones are imbedded is carefully chipped away and the missing parts restored in cement and plaster. The bones are then assembled as in life. In the specimens on exhibition the restored parts differ in color from the original parts of the skeleton and can readily be distinguished.

As a whole, the Museum collections of fossil vertebrates are believed to be the finest in the world, if we take into consideration not merely numbers, but also variety, quality and perfected methods of preparation and exhibition. The collections illustrating the evolution of the horse are probably equal to those of all other institutions combined. The collections of Permian reptiles, of Jurassic and Cretaceous dinosaurs, of turtles, of North American Tertiary mammals, and of extinct mammals of South America, are likewise of the first rank. There are more than seventy complete skeletons on exhibition, several hundred skulls and nearly two thousand jaws or other parts of various species. About ten times this number are in storage, reserved for study and research, or not yet prepared for exhibition.

EAST CORRIDOR

Fossil Fishlike Lizards

Directly in front of the elevator is a wall case in which the most recently acquired specimens are placed. The cases attached to the wall near the stairway contain specimens of huge marine fishlike lizards, which show the tremendous pressure to which fossils are often subjected and the fragmentary condition in which they are found.

SOUTH PAVILION

Hall of the Age of Man

The *South Pavilion* is devoted to early man, represented by a series of casts of the more noteworthy specimens, and to his contemporaries, the mammoths and mastodons and the giant ground sloths of South America.

On the left is a series of modern skeletons illustrating the evolution of the horse under the hand of man. Here are such extremes as the Shetland pony, only two feet ten inches high, and the rough-boned draught horse, which stands six feet one inch in height. Contrast these with the slender-limbed "Sysonby" the famous race horse, and the Arabian stallion "Nimr". The horse

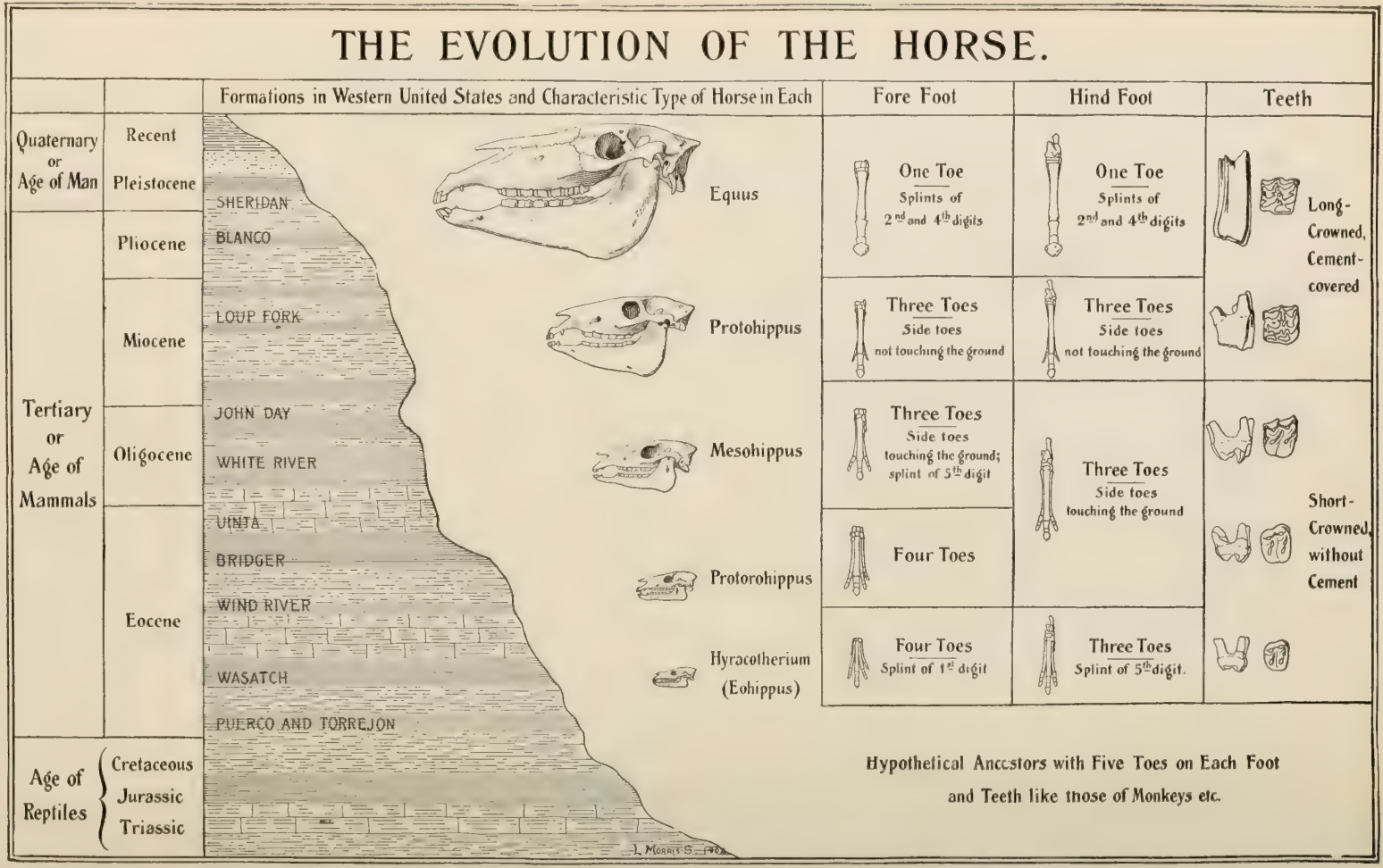
Skeletons of Modern Horses

THE GROUP OF GIANT GROUND SLOTHS

Fossil mammals from South America adapted for digging above the roots of trees for the purpose of pulling them down to feed on the leaves and twigs.

(See Leaflet, THE GROUND SLOTH GROUP for a full description.)

THE EVOLUTION OF THE HORSE.



The history of the evolution of the horse through the Age of Mammals gives the best example in existence of the doctrine of evolution by means of natural selection and the adaptation of a race of animals to its environment. During three millions of years these animals passed through important changes, especially in the teeth and feet, adapting them more and more perfectly to their particular environment — namely, open plains with scanty, stunted herbage.

lover will also be interested in the osteological collections in the wall cases which show how to tell the age of horses through the growth and development of the teeth.

Beyond the Horse exhibit on the left are fossils from South America, the most striking of which is the group of giant ground sloths. There are also good examples of the Glyptodon, a gigantic relative of the armadillo, of the camel-like *Macrauchenia*, the rhinoceros-like *Toxodon*, and other strange extinct animals which evolved in South America during the Age of Mammals, when it was an island continent, as Australia is to-day. Here, too, is the great sabre-tooth tiger, one of the host of northern animals that invaded the southern continent upon its union with the northern world, and swept before them to extinction most of its ancient inhabitants.

Fossil Mammals of South America

In the center of the hall is a skeleton of the giant carnivorous dinosaur *Tyrannosaurus* excluded from Dinosaur Hall for lack of space To the right is a small collection of fossil remains of man illustrating what is known of the prehistoric record of our own race.

The principal exhibits on the north side of the hall are the mammoths and mastodons and the series of skulls showing the evolution of the elephant. The "Warren Mastodon" is a classic specimen. It was found near Newburg, N. Y., in 1846, and is the finest specimen of its kind that has ever been discovered. Next to it is a fine skeleton of the mammoth; portions of skin, hair and other fragments of a mammoth carcass discovered in Alaska are also shown. While modern elephants are confined to portions of Asia and Africa, fossil remains of elephants and mastodons show that, at one time or another in the past, they were found over the greater part of the northern hemisphere.

Warren Mastodon

The skeleton of an African elephant, the once famous Jumbo, whose name has been embodied in the English language as a term for anything unusually large, is shown for comparison with its extinct relatives.

Jumbo

[See *Handbook No. 4, Animals of the Past*, and *Guide Leaflet No. 43, Mammoths and Mastodons.*]

SOUTHEAST WING

Hall of the Age of Mammals

Fossil Mammals of the Tertiary Period

Return to the East Corridor and continue into the *Southeast Wing* or Tertiary Hall which contains the Fossil Mammals of the Tertiary Period.

The geological age to which all the fossils shown in this hall belong covers a period of from 100,000 to 3,000,000 years. At each side of the entrance are charts indicating the successive periods of time from the Triassic to the Tertiary, and the animal life which pertained to each.

Restoration of Eohippus, the four-toed horse. This ancestor of the modern horse, scarcely larger than the red fox, lived some three millions of years ago. It comes from the Lower Eocene of Wyoming and New Mexico.

Careful guides and exhaustive cards of explanation, photographs, and window transparencies combine to make the entire exhibit illuminative and interesting.

Evolution of the Horse

The particular feature of this hall is the wonderful series in the cases by the entrance and in the first alcoves on the right showing the evolution of the horse in nature. The Museum is justly proud of this collection. Not only is it the largest and finest series of fossil horse skeletons in the world, but it is larger than the combined collections of all other institutions, and it con-

tains the earliest known ancestors of the horse, the little four-toed *Eohippus*, which was no bigger than a fox and on four toes scampered over *Tertiary* rocks. As will be seen by an examination of the skeletons of the horse and man, the modern horse walks on the tip of his middle finger and toe. The front hoof bone corresponds to the last joint of the third finger in the human hand, and the other bones of the leg correspond bone for bone with the structure of the finger, wrist and arm of man. The similarity in structure of the skeletons of horse and man is brought out in the exhibit of a rearing horse being controlled by man. A comparison of these two skeletons will show that although very different in proportions the bones of the one correspond with the bones of the other. In the modern horse the remaining fingers or toes of the fore and hind foot have entirely disappeared, or remain only as vestiges, the so-called "splint bones." The structure of the modern horse shows that it developed from a five-toed ancestor. This ancestry has been traced back to the four-toed stage. [See *Guide Leaflet* No. 36. *The Evolution of the Horse.*]

In the wall case at the right of the entrance is given a synopsis of the evolution of the foot and skull of the horse and the geological age in which each stage is found. Across the alcove the visitor will find the skeleton of *Eohippus*, the four-toed stage of the horse and the earliest form that has been discovered. This specimen is from the Wind River beds of Wyoming and may have lived 3,000,000 years ago. It is interesting to note that while there were no horses found in this country by the white settlers, America is the original home of the horse.

Passing from skeleton to skeleton the changes that have taken place in the development of the horse are easily distinguished. The exhibit is made more lifelike by plaster restorations of the animals and by water-color sketches showing primitive horses in their environment. These paintings and models are by Charles R. Knight. In the later types of the three-toed stage the two lateral toes have lost their original function of support and are gradually becoming vestiges. The three-toed horse in the center of the alcove is one of the most complete and finest examples that has ever been unearthed.

Opposite the horse exhibit on the other side of the hall, are series of specimens illustrating the evolution of the camel, deer and other cloven-hoofed animals. These animals like the cow of to-day walked on the tips of the third and fourth fingers, and the gradual disappearance or reduction to useless vestiges of the other fingers and toes can be traced as in the horse series.

Camels

The large blocks showing groups of skeletons of early camels, skulls and bones of primitive ruminants in their natural

TYRANNOSAURUS, THE GIANT CARNIVOROUS DINOSAUR

A man would have been but a mouthful for this latest and largest of flesh-eating dinosaurs. This skeleton is temporarily installed in the Hall of the Age of Man. It is far more ancient than the fossils in that hall, for it lived during the Cretaceous Period, over three million years ago.

position in the rock, show how these specimens are sometimes found and raise questions as to how they got there, more easily asked than answered. The giant pigs, or elotheres, and the pygmy hippopotamus will repay examination.

Giant Pigs and Pigmy Hippopotamus

The primitive rhinoceros-like animals are shown near the center of the hall on the right. It seems hard to believe that our vast western country and indeed all North America was once the home of the rhinoceros. As here indicated great herds roamed over the fields in the Tertiary Period and their fossil remains are found

Rhinoceros

Restoration of Brontosaurus. One of the largest of the amphibious dinosaurs, cold-blooded, slow-moving, unintelligent creatures that grew to large size (65 ft. in length) in the rich vegetation of the Reptilian era.

imbedded in the sandstones and clays of the badland formations. Opposite these are shown the ancestors of the dogs, cats and other carnivores and the Creodonts or Primitive Carnivores of the early Tertiary. Next to these are the small mammals—the insectivores, rodents and marsupials; and the fossil lemurs and monkeys, fragmentary but interesting because of their bearing on the ancestry of man.

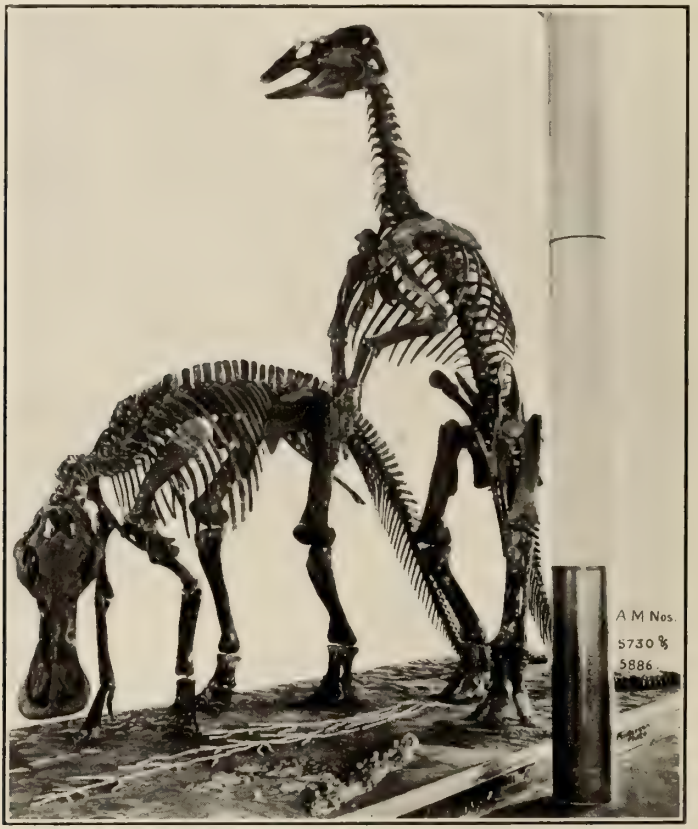
On the south side on the right are skeletons of titanotheres, on the left of uintatheres, huge extinct, horned animals peculiar to North America.

SOUTHEAST PAVILION

Dinosaur Hall

Fossil Reptiles, Amphibians and Fishes

The visitor now enters the *Southeast Pavilion* containing the dinosaurs and other fossil reptiles and also fishes. These animals belong to a more ancient period than the specimens just examined. They lived from



DUCK-BILLED DINOSAURS, TRACHODON

3,000,000 to 10,000,000 years ago. They include the well-known dinosaurs of which the Museum has a large collection. In the wall case on the left is a portion of the skeleton of the dinosaur *Diplodocus;* this was the first of these specimens to be unearthed by the Museum, while on the right is a nearly complete skeleton of another dinosaur (*Saurolophus*) mounted as it lay when, three millions years ago, it settled to the bottom of a western lake where it was gradually covered with sand and mud and slowly turned into stone.

The Dinosaur Diplodocus

The gigantic skeleton in the center of the hall is the huge extinct reptile, the dinosaur *Brontosaurus*, found in the Jurassic beds of Wyoming. It is the only mounted specimen of its kind in the world and more than two-thirds of the skeleton is the original petrified bone. It is sixty-six feet eight inches in length, sixteen feet in height and is estimated to have weighed when alive thirty-five tons. Brontosaurus is one of the largest giant reptiles and as is indicated by its teeth was herbivorous, probably living on the rank water weeds of the nearly sea-level marshes of Wyoming. Contrasted with the herbivorous Brontosaurus is the carnivorous dinosaur *Allosaurus*, mounted to represent the animal feeding on the fallen carcass of a Brontosaurus, upon which it preyed.

Brontosaurus

Allosaurus

Section of the skin of Trachodon showing the small scutes with which the animal was covered. About natural size.

This is not a fanciful mounting, for these very skeletons were found in close proximity to each other in the Jurassic beds of Wyoming, and the skeleton of the fallen Brontosaurus shows gouges made by the teeth of Allosaurus as it tore the flesh from its victim.

Near the Allosaurus group is a portion of a skeleton of *Tyrannosaurus*, the last and most powerful of the carnivorous dinosaurs. A complete skeleton is temporarily placed in the Hall of the Age of Man, as there is not room for it in the Dinosaur Hall.

Tyrannosaurus

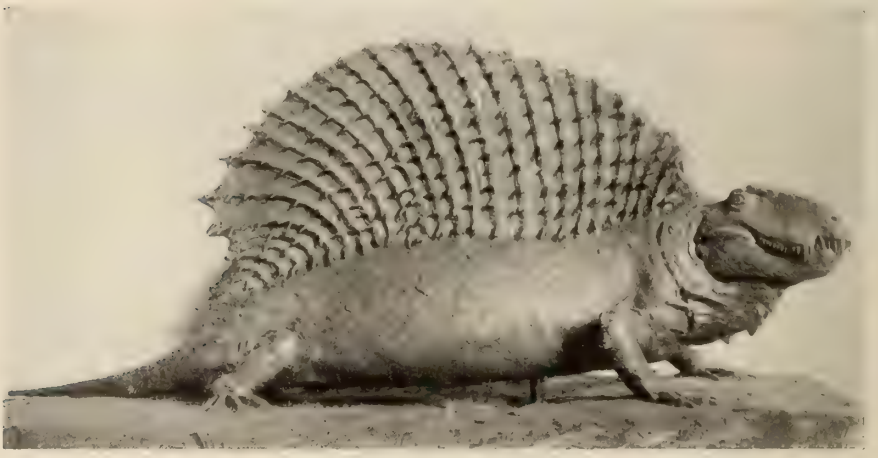
To the left of Brontosaurus are two complete specimens of the duck-billed dinosaur *Trachodon*. One shows the animal erect and standing on guard, while the other is shown feeding on shellfish and plants of the Cretaceous swamps of Montana.

Trachodon

Mummied Dinosaur

Most wonderful perhaps of all the specimens shown here is a "mummy" of *Trachodon* in which the texture of the skin is preserved. The animal is lying on its back and, in spite of its crushed condition, its form is easily distinguishable. It probably died on a sand bank or near a shoal where the hot winds dried up the flesh until the skin adhered to the bones like a close-fitting glove, and was subsequently buried by a flood.

Other specimens shown in the hall include the smaller carnivorous dinosaurs, the horned dinosaurs with, in one instance at least, a skull seven feet in length, and giant birds possessed of teeth. There is also the



RESTORATION OF NAOSAURUS

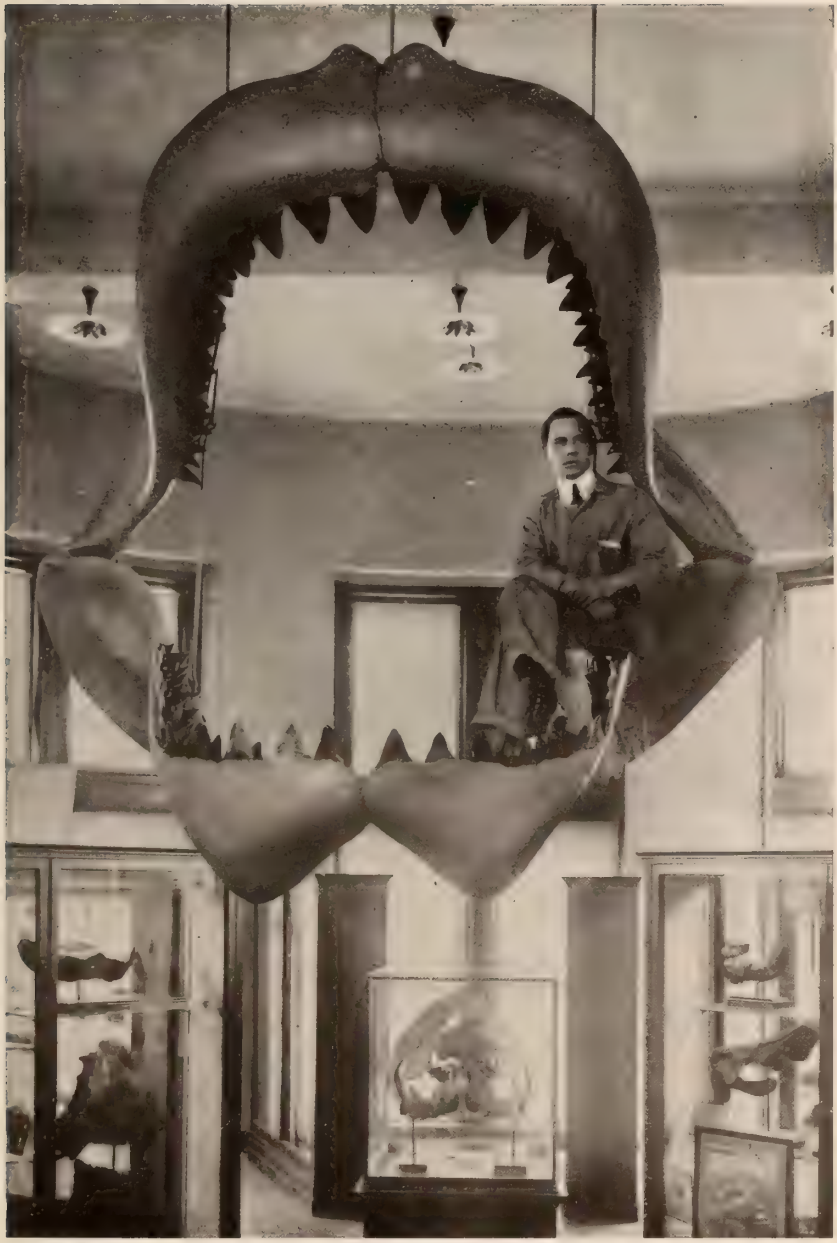
One of Nature's jokes. Professor Cope, who was also a joker, suggested that the high fin served as a sail, by means of which Naosaurus sailed over the lakes near which it lived.

finback lizard, one of the most ancient of fossil reptiles; *Diadectes*, a reptile with a solid-boned skull and *Eryops*, a primitive amphibian. The finest collection of fossil turtles in the world will be found on the south side of the hall.

[See *Handbook* No. 5, *Dinosaurs*.]

Fossil Fishes

In the *Tower* of the Southeast Pavilion are displayed the fossil fishes which belong to a much earlier period than the mammals and reptiles, some of them having lived twenty to fifty millions of years ago. Many of these forerunners of backboned animals are quite unlike any living fishes and are probably only very indirectly related to them; some were small, curiously encased in shells; others, shown in the three cases in front of the visitor, attained large size and were evidently formidable creatures. One of them in



RESTORATION OF THE JAWS OF A FOSSIL SHARK

This largest and most formidable fish, living or extinct, of which we have any record, frequented the coast of South Carolina in Tertiary time. The jaws measure nine feet across; estimated length of fish, eighty feet, as large as a sulphur-bottom whale.

fact, *Dinichthys*, shown in the middle of the gallery, was probably among the most destructive creatures that ever lived in the sea. Its jaws were so strong that it could crush a plate of bone as thick as one's hand. Such an actual specimen, fractured in life and showing the marks of "teeth" is shown in a neighboring case.

The collection is so arranged that he who makes the tour can see the principal kinds of fossil fishes and is able, in a measure, to outline the history and pedigree of the entire group. He can trace the rise and fall of the early plate-covered fishes; the era of the sharks which on the one hand supplanted the earliest fishes and were in time replaced by the more efficient lungfishes and ganoids; the age of ganoids when the waters were filled with these enamel-scaled fishes; finally the age of the bony-fishes, or teleosts, the multitudinous forms of to-day, the herrings, cods, perches, whose methods of swimming, feeding and breeding are far more efficient than those of any of their predecessors.

Jaws of Giant Fossil Shark

Above the entrance are the jaws "models", spreading nine feet, of a huge fossil shark in which the actual teeth are arranged as in the sharks of to-day, in the usual banks or rows—the teeth in the hinder rows serving to replace those in front, nature having dealt more kindly in the matter of teeth with sharks than with man. Such a shark probably measured from seventy to ninety feet and its race may well have become extinct, when for various reasons the enormous volume of food necessary to support it could not be maintained within its range of sea.

Fossil Aquarium

In the first alcove to the left, by the window, is a "fossil aquarium" in which a number of models of these earliest fishes are arranged in a group, as though alive in the sea.

Sharks

In the next alcove are the early fossil sharks which superseded the tribe of plated fishes just mentioned. These sharks had soft skeletons, simple fins and a number of other primitive features which lead to the belief that all of the higher fishes, and the higher back-boned animals therefore as well, were descended from them, their simpler structures becoming more complicated in many directions. In one of the early sharks here exhibited, impressions of soft parts such as muscles and gill filaments have been preserved.

Chimæroids

In the third alcove appear rare fossils of silver sharks or Chimæroids, which appear to have been developed from a primitive race of sharks. Curiously enough fossil egg capsules of these forms are sometimes preserved, and examples are here present. In neighboring cases are shown ancient lungfishes and ganoids—groups from which all land-living quadrupeds are believed to be descended.

THE "FOSSIL AQUARIUM" IN THE FISH GALLERY

This shows what can be done to make these ancient forms appear as living. The group illustrates the typical "Age of Fishes," Devonian, in which the forms came from a single locality (Cromarty) and a single rock layer in the Old Red Sandstone of Scotland. The seaweed is also a restoration, modeled from impressions of the same age.

Cromarty is noteworthy, not merely for its deposits of Fossil Fishes but for being the birthplace of Hugh Miller, whose discoveries and descriptions did so much to make the fishes known alike to the scientific world and the general public.

Ganoids

In the fourth alcove are shown the ganoid fishes which dominated the waters during the Age of Reptiles. They were of many kinds and sizes, most of them with lozenge-shaped scales of bone, with enamelled surface. One of the few survivors "*Amia*" of this ancient group is here shown living "in a window aquarium", to give the visitor a clearer idea of the fishes of the "Middle Ages" of the world.

Teleosts

In the fifth alcove are the petrified fishes of the Age of Mammals. By this time nearly all of the primitive fishes, like sharks, lung-fishes and ganoids, had become extinct; and the common forms were bony-fishes, or teleosts, closely related to our herrings, perches, mackerels and daces.

[*Return to the South Pavilion or Hall of Mastodons and Mammoths.*]

SOUTH CENTRAL WING

Geology and Invertebrate Palæontology

Turning northward at the center of the Quaternary Hall containing the mastodons and mammoths, the visitor enters the *South Central Wing* of the building and is in the Hall of Geology and Invertebrate Palæontology. Palæontology is the science of the ancient life of the earth; its field is the study of the fossilized shells and other hard parts and the various kinds of imprints left by the animals formerly inhabiting the seas and lands, and preserved in deposits which now form our stratified rocks. As normally the upper layers of a series of strata are more recent than the lower, the fossils reveal the succession of life forms in the earth's crust and thus are of the highest value and interest to the student of historical geology. Since, however, the remains of only a small proportion of the animals living at a given period are permanently preserved in the marine, river, lake and subaerial deposits of that period, the geological record of animal and plant forms is far from complete. Inasmuch as invertebrate animals are far less free in their movements than the vertebrate forms, they are accepted as the best determinants of the geological age of a bed of rock, even when remains of both kinds are found together. Invertebrate life, too, appeared on the globe far earlier than vertebrate, and remains of certain species are abundant in the lowest "oldest" of our stratified rocks.

Meteorites

In the alcoves of the hall is the general collection of meteorites, which is one of the largest and most representative in this country, containing as it does specimens from about five hundred of the seven hundred falls and finds that are known throughout the world. Some of the principal features of our collection are:

Two thousand or more individual masses from the "stone shower"

that fell near Holbrook, Arizona, in 1912. These have been arranged in a case by themselves.

The whole mass of Ysleta, a newly discovered "1914" iron meteorite, weighing 310 pounds from near the ancient village of Ysleta, New Mexico.

A series of polished and large etched slices of iron meteorites, including an entire section of the new Mt. Edith, Australia, mass, showing the Widmanstätten lines in great perfection, and polished slabs from several large stones meteorites. These are in a case by themselves which likewise contains several comparatively large entire single masses of some famous falls.

An exhibit of meteoritic masses, decomposition products, and country rock showing unaltered material and that which was melted and otherwise altered by the impact of the Canyon Diablo meteorite at the spot now known as Meteor Crater, Arizona. This exhibit has been loaned to the Museum by Princeton University.

Types

In the desk cases down the center of the hall are the types and figured specimens used by James Hall, R. P. Whitfield and others in the original description and naming of species, or in their further elucidation.

Stratigraphic or Historical Geology

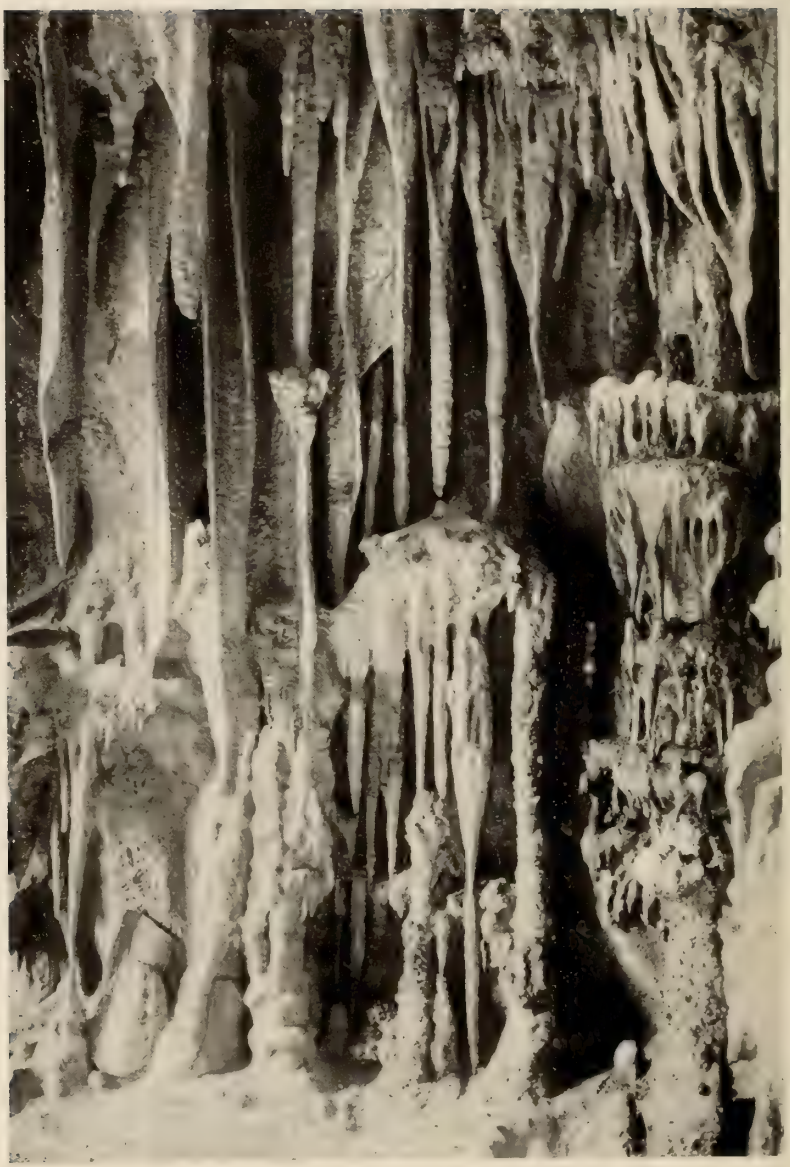
The specimens in the cases on the left or west side of the hall are being arranged to illustrate stratigraphic geology, beginning at the south (entrance) with the Archean rocks, which are the lowest and oldest of all and contain no fossils, advancing regularly through the Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Jurassic, Triassic, Cretaceous and Tertiary. Most of the specimens on exhibition are from American localities and the species are arranged according to their position in the scale of life, the lower, or simpler forms being placed first. The specimens shown are those particularly characteristic of the various horizons, the object being to give an idea of the general character of the life of different periods of the world's history. The ends of the cases contain large or striking fossils.

Biologic Geology

The specimens on the east, or right, side are being arranged to illustrate biologic geology, the classification and relationships of the plants and animals of past geologic times. The series starts with the plants and is followed by the various sub-divisions of the animal kingdom, again beginning with the lower, or simpler forms and continuing to the highest.

Fossilized Tree Stump

In the first alcove on the right is the stump and part of the roots of a large tree from an anthracite coal mine under Scranton, Pa. Millions of years ago, in the geological period known as the Carboniferous, this tree grew upon the top of a



A BIT OF WEYER'S CAVE

Part of the section collected by W. B. Peters and P. B. Hill and installed by W. B. Peters.

thick swamp deposit of decaying vegetation which ultimately became a most valuable bed of coal. The stump was left in the roof of the mine when the coal was extracted for commercial and domestic uses. It fell to the floor years after the gallery had been abandoned and was discovered only through the chance visit of a miner.

Geology of Manhattan Island

Half way down on the east side is a desk case containing a series of rock specimens illustrating the geology of Manhattan Island. This is arranged geographically and shows the more prominent features of local geology from south to north.

Copper Queen Mine Model and Exhibit

The northeastern corner of the hall is devoted to the Copper Queen Mine Model and a series of ores and other specimens from the famous Bisbee-Warren copper district in southern Arizona. Two models have been prepared as a result of several years of extremely painstaking and skillful work. A large model, some 18 by 12 feet in dimensions, shows on a scale of twenty-four feet to the inch all the surface features and mine and other buildings over four of the principal mines (Holbrook, Spray, Gardiner and Lowell) belonging to the Copper Queen Consolidated Mining Company, while a painted background represents the surrounding mountains and the town of Bisbee. The sides of the model give vertical sections to the depth of about 1200 feet illustrating the geology of the area and showing the general manner of getting out the ore and hunting for new deposits. There have been produced in about 30 years (1880-1912) from the mines at Bisbee belonging to this company 7,729,922 tons of copper ore of an average copper content of 7.16%. The metal production in this period was

Copper—1,106,605,774 pounds (553,303 tons)
Gold —104,775 ounces Troy (8,731 pounds)
Silver —6,107,421 ounces Troy (508,952 pounds).

Near the large general model there has been installed a small model on a scale of six feet to the inch showing the usual methods of extracting the ore by "stoping." Drilling, picking, timbering, filling old cavities, transporting, raising ore to the surface and other operations are illustrated as well as is practicable on the scale adopted. The shaft is equipped with its cages, which are arranged so that they go up and down by means of automatic machinery.

Specimens of ore, minerals and rocks from the mine and the adjacent country illustrate the geology of the region. Chief of these specimens are velvet malachites that were taken from the original "Queen" mine, the Open Cut, in the early eighty's and a great block of malachite and azurite weighing about four tons taken from the Mine in 1892 and exhibited in

THE COPPER QUEEN MINE MODEL AND ITS MAKERS

This wonderfully accurate model was presented by Dr. James Douglas. Its construction, aside from the necessary surveys, occupied three years.

the Arizona mining exhibit at the Columbian Exposition in 1893. Enlarged photographic transparencies give details of scenery and mining, supplementing what is shown by the models. The work of treating the ores at the smelter in Douglas near Bisbee is demonstrated in a neighboring case.

Caves

The northwest corner of the hall contains a display of caves and cave material including a reproduction of part of a beautiful cave that was discovered early in 1910 in mining operations at the Copper Queen mine. The cave was formed by the dissolving action of water traversing joints in limestone, and its walls, roof and bottom were afterward coated with calcite (calc spar) incrustations, stalactites and stalagmites, some of which are dazzling white while others are colored green with copper salts or pink with manganese compounds.

Alongside the Copper Queen cave is a reproduction of a chamber in Weyer's Cave, Virginia. Weyer's Cave is in a region of much heavier rainfall than Bisbee, which is probably the principal factor in producing a greater wealth of regular stalactite and stalagmite growth than adorns the Copper Queen cave, and this exhibit illustrates not only their great variety in form but the reasons for this extraordinary diversity.

Among the cave material shown nearby is a series of tumblers into which water from the stalactites was allowed to drip for stated periods, the thickness of the deposit giving some measure of the length of time necessary for the formation of stalactites and stalagmites.

Chihuahua Cave Material

Particularly attractive are the marvelously beautiful specimens of calcite, aragonite and gypsum from the famous silver-and-lead mines near Santa Eulalia in the vicinity of Chihuahua, Mexico. These specimens are remarkable for the perfection of their crystalline form or the delicacy of their fibrous developments and for their colors.

[*Return to the Hall of Mastodons and Mammoths and turning to the right enter the West Corridor or Gem Hall.*]

MOSS AGATES FROM HINDUSTAN
In the Morgan Gem Collection

CRYSTAL BALL

WEST CORRIDOR

Gems and Precious Stones

Gems and Precious Stones

The West Corridor contains the Morgan gem collection. This valuable series of gems and precious stones was presented to the Museum by Mr. J. Pierpont Morgan, one of the founders and a trustee of the institution, whose services to the country in the founding and up-building of the Museum are commemorated in a bronze tablet by Miss Longman at the south end of the hall. It comprises a representative assemblage of cut and uncut gems, many of the former of remarkable size and some of great purity of color. The installation aims to bring into juxtaposition the cut and uncut material, the former is arranged around the latter, in the center of the cases, and the visitor may thus observe the brilliancy of effect produced in the natural mineral by skillful artificial treatment (cutting).

A partial graduation in importance and value is obtained by the arrangement of the gems, beginning with Diamond at the extreme south and passing north, case by case (through Corundum (*Sapphire*), Beryl, (*Emerald*), Topaz, Tourmaline, Chrysolite, Spinel, Zircon (*Hyacinth*), Chrysolite (*Peridot*), Adularia (*Moonstone*), Opal, Amethyst, Kunzite, Amber, Pearls.) In one case a varied collection of semi precious or ornamental stones is shown, many of which are experimental efforts to use mineral material which can never have any very extended use, viz., prehnite, titanite, sphalerite, hematite, cyanite, etc., etc.

Handsome wall case specimens of large size line the sides of the Gem room, among which the Azurite, Malachite, Quartz, Amethyst, Gypsum and Tourmaline are preeminent for size or beauty.

SOUTHWEST WING

Minerals

Next beyond the Gem Hall is the *Southwest Wing* or Hall of Minerals. At the entrance to the hall is a case in which recent acquisitions are placed. The general collection of minerals consists chiefly of the well-known Bement Collection which contains specimens representing species of the known minerals of the world. Not only is the collection noted for its numbers, but in many instances the beauty and size of the individual specimens are quite unsurpassed in other collections.

Bement Collection of Minerals

The more attractive specimens are displayed in cases arranged down the center of the room. The remainder of the collection is arranged according the classification of minerals. In the first cases on the right or left are models of the six systems of crystals and other introductory illustrations of the physical and optical properties of minerals. Each mineral has a characteristic form of crystallization which is one of the means of identifying it. The distribution of the more important minerals is indicated on maps.

SOUTHWEST PAVILION

Collections From the Pacific Islands

On entering the Southwest Pavilion beyond the Hall of Minerals the visitor faces groups representing the natives of the Pacific Islands. Directly in front is a Tahitian priest taking part in the fire-walking ceremony, in which the participants walk over heated boulders of lava.

On either side are groups engaged in grating cocoanut, making kava, and weaving mats for a house.

In the entrance aisle is a Hawaiian feather cape, such as were worn by the kings and chiefs of Hawaii, especially in war. This specimen has been in America more than a century. The red and yellow feathers are taken from a species of honey sucker. The work required in obtaining the feathers and making the cape is very great.

The hall as a whole falls into two main divisions. On the east are the Polynesians and Micronesians who inhabit Samoa, Hawaii, Tahiti, Marquesas, the Gilbert, Marshall, and Caroline Islands.* Their

HAWAIIAN FEATHER CLOAK

weapons, mats, tapa cloth and the implements used in its manufacture are of especial interest. There are a number of models of canoes to remind us that these people are wonderful boatmen and adventurous seafarers. On the west side are the Melanesians of the Bismarck archipelago, the Solomons, New Hebrides, and New Caledonia. Especial attention is directed to their carvings in wood shown in the large case of sacred masks, and the poles on the case which resemble the totem poles of the Northwest coast of America.

Near the entrance to the tower are cases devoted to the natives of Australia, in which are their boomerangs, crude stone tools, and interesting ceremonial objects.

In front of the tower a Maori warrior is balanced on a large boulder

* The Fijians, while Melanesian in race, have a culture very similar to that of Samoa and are therefore represented in the same section of the hall.

GENERAL VIEW OF THE PHILIPPINE HALL

of jade in an attitude of defiance. Within the tower devoted to these native inhabitants of New Zealand is a series of dried, tattooed heads, grewsome relics of the time when Maori warriors preserved the heads of their vanquished enemies. In this tower, also, are specimens of carving in wood and stone. In the center is a model of a carved storage house. In one case are several examples of clothing, a feather cape, and woman's skirt.

In the northwest corner of the main hall are several cases devoted to New Guinea. The more prominent objects are nets, stone adzes, carving, and painted tablets and shields. Resting on the case by the doorway are two carved ancestral figures of considerable interest.

The hall due north beyond the Hall of the Pacific Islands is devoted to a collection from the Philippine Islands. Occupying the middle of the hall are several interesting groups and large objects. First is the model of a woman weaving a garment on a native loom. Next is the model of a small house with walls of bamboo and roof of thatch. Beyond the house is to be seen a sailing canoe, outrigged to prevent capsizing. The use of bamboo in place of rope in the rigging of this canoe is of especial interest. At the very end of the hall is a native house perched in the top of a tree.

TAHITIAN FIRE WALKER

In the cases on the west side of the hall are arranged collections

relating to the Bagobo of Mindanao Island. In the several cases are to be found collections showing the native work in metals, the garments of native fibre decorated with beads, and a very interesting and quite complete exhibition of textiles, showing the materials, looms and finished products.

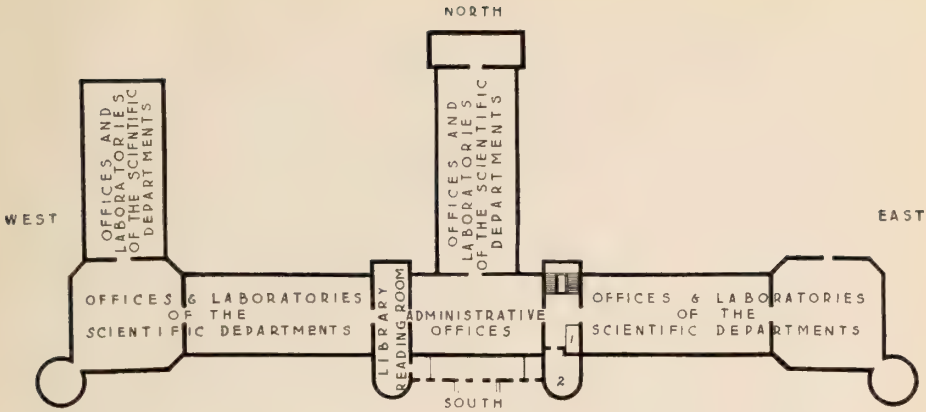
MAORI WARRIOR IN ATTITUDE OF DEFIANCE

At the farther end of the hall are two cases given over to the representative peoples of the islands of Sumatra, Celebes, and Java, showing their knives and blow-guns.

The Samal and Sulu Moros representing the Mohammedan population are next in order. Their war-like character is indicated by the predominance of spears, krises, and shields. There are also some examples of their work in pottery and basketry.

The Igorots of the Island of Luzon have examples of their metal work, weapons and shields, basketry and textiles displayed in cases midway of the hall on the east side.

The Negritos are of special interest because of their small size. They are pygmies and are believed to be descended from the first inhabitants of the island. In the case devoted to them are to be seen an interesting array of diminutive poisoned arrows and the accompanying bamboo quivers.



1. Elevators
2. Office of the Director.

FIFTH FLOOR

The fifth floor is given over to the administrative offices, the offices and laboratories of the scientific departments and the library which contains some 70,000 volumes on natural history, anthropology and travel.

The library now contains over 15,000 volumes on zoölogy, comprising many of the extremely rare and interesting monographs in ornithology; an excellent collection of 3,500 volumes in entomology, including many of the rare classics, and a 2,000 volume collection in conchology containing the standard works of Küster, Reeve and Binney. There is also a well selected collection of 2,500 volumes in anthropology, including many of the older works relating to the North American Indian; an excellent collection of 3,500 volumes in geology enriched by the library of the late Professor Jules Marcou; a collection of 5,000 volumes in palæontology, to a large extent composed of the Osborn Library of Vertebrate Palæontology; also an unusually complete collection of more than 25,000 volumes of natural science periodicals.

The reading room of the library is located in the west corridor and, with the exception of Sundays and holidays, is open free daily, from 9 A. M. to 5 P. M., to all who may wish to consult the books. Besides the current issues of the more important periodicals, it contains the more general works of reference, while other volumes will, upon application to the librarian, be furnished to those who wish to consult them.

On this floor, too, are the workrooms of the Department of Vertebrate Palæontology, where the skeletons of fossil animals are prepared and mounted, and the laboratory where are made the beautiful models of invertebrates.

These, like the other laboratories, are of necessity not open to the public.

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